

INSTRUCTIONAL MATERIALS SPECIFICATIONS

Technology Education

Grades 6 – 12

2003 - 2004 Adoption



**Division of Public Schools and Community Education
Bureau of Curriculum, Instruction and Assessment
Office of Instructional Materials**

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Florida Department of Education

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Florida Perspective

Technology Education Vision:

All Floridians will possess the knowledge, skills, attitudes, and abilities to become technologically literate.

The Florida Curriculum Frameworks for Technology Education are based on the national standards: *Standards for Technological Literacy: Content for the Study of Technology* as well as the Florida *Sunshine State Standards*. The national standards promote technological literacy for all students in kindergarten through grade twelve. Technological literacy is defined as the ability to use, manage, understand, and assess technology. This can be accomplished through a series of technological experiences that build upon a student's development within the following areas:

- The Nature of Technology: how students modify the world around them to meet their needs and wants.
- Technology and Society: how the use of technology affects society and the environment, as well as how society influences the development of technology, and how technology has changed and evolved over the course of human history.
- Design: how students develop solutions to a problem, while considering criteria and constraints, aesthetics, applicability, and feasibility of the solution.
- Abilities for a Technological World: the development of abilities to use the design process, using and maintaining technological products and systems, and assessing products and systems.
- The Designed World: understanding how resources – materials, tools and machines, people, information, energy, capital, and time – are processed to become usable products.

Broadly speaking, technology is how people modify the natural world to suit their own purposes. Technology Education is a study of technology which provides an opportunity for students to learn about the processes and knowledge related to technology that are needed to solve problems and extend human potential.

Technology Education is concerned with the broad spectrum of technology which encompasses, but is not limited to such areas as: design, making, problem solving, technological systems, resources and materials, criteria and constraints, processes, controls, optimization and trade-offs, invention, and many other human topics dealing with human innovation. Technology Education in Florida encompasses

those technological areas that are vital to the state's economic development and support its educational mission, while providing a sound foundation of technological literacy to make informed career choices about emerging opportunities that may not yet exist.

Rapid advances in technology are forcing changes in educational content and methodology and are pointing out the necessity for preparing students who need to be technologically literate and ready for the future. We are in the midst of a technology explosion that will continue into the 22nd century. It is altering our lifestyle and our work style. Citizens of Florida must understand technology as an integral part of our everyday lives. That is why teaching about technology and its impact on all of us is of vital importance at all grade levels in our schools. It is a fundamental area of study for all persons, regardless of educational or career goal.

Technology Education is responding to the realities of a new age that requires students to be prepared with universally transferable technological skills for life and success in a modern world. It is an educational program that teaches students how to survive in a modern world. It is an educational program that teaches students how to survive in an economy that needs, uses, and rewards an array of human talents much wider than the narrower academic and occupational skills that are traditionally taught. Technology Education provides a setting to strategically teach essential skills. It is a logical link in the educational process that treats both academic and vocational skills in a theoretical and applied way. Students are provided optimum experiences, both abstract and concrete, through the applied study of technological tools, materials, systems, and processes. This is a type of learning that allows students to make sense out of their world and provides the correct balance of depth and breadth to enable them to deal with a world of boundless change and complexity. Students in Technology Education learn to apply problem-solving skills to the solution of community, industry, life problems, and technological issues facing Florida. They develop an attitude that learning is a lifelong process. They recognize the consequences of technology on the individual and society. The end result is a new educational essential called technological literacy. It not only enables our youth to be technologically informed, but to also have technological understanding. It enables our youth to be technologically wise, as well as technologically smart.

The program of Technology Education is organized around, but not limited to, the technological categories of drafting, electronics, communications, construction, production, power, transportation, aerospace, engineering, and supporting content areas. Applied learning activities are conducted in a laboratory setting using hands-on experiences with technological tools, machines, instruments, materials, processes, and systems.

Consistent with individual abilities, interests, and needs, the Technology Education student will:

1. Establish a knowledge of and appreciation for the importance of technology.
2. Apply technological tools, machines, instruments, materials, processes, and systems safely and effectively.
3. Develop the skills, creative abilities, positive self-concepts, and individual capabilities to use a variety of technologies.
4. Develop problem-solving and decision-making abilities using technical means.
5. Apply other school subjects appropriate to technology content, instruction, and laboratory activities.

6. Uncover and develop individual talents and interests.
7. Become a wiser consumer.
8. Develop a positive attitude toward lifelong learning.
9. Demonstrate positive human relations, leadership skills, organizational abilities, and technological literacy through participation in the Florida Technology Student Association (FL-TSA).
10. Become confident in their technological abilities.
11. Explore and become aware of various career choices and options in our technological world.
12. Develop competencies to adapt to living in a changing world and a strong foundation for advancement to post-secondary education in a technological field.

It is essential to understand that a quality program incorporates opportunities for application of mathematical and scientific concepts in the solutions to problems. In addition, the curriculum frameworks are correlated with the Sunshine State Standards in Mathematics, Science, Language Arts, and Social Studies to ensure the academic relevance of the content being covered.

Instructional materials for Technology Education should be based upon accepted principles of learning and be consistent with current and confirmed research in Technology Education. Proposed activities, procedures, examples, and strategies should be supported by what is known about learners' physical, emotional, and intellectual development. It is vital that the materials include provisions for varied learning styles and cultural experiences. Where appropriate, teacher's materials should reference specific research to assist the instructor in making informed choices.

A balanced program is one that contains a variety of instructional activities to support comprehensive learning in technology. While most Technology Education instruction begins with research and design, the materials should also foster creative thinking, technological processes, construction, analysis and evaluation, cultural and historical connections, and real life connections. In addition, Florida State Law requires that Career and Technical Student Organizations (CTSO) shall be an integral part of the vocational instructional program. The Florida Technology Student Association is the appropriate CTSO for providing leadership training experiences and reinforcing specific academic and vocational skills within Technology Education.

Instructional materials must be authentic to all academic disciplines and support and reinforce Florida's *Technology Education Curriculum Frameworks* and support and reinforce Florida's *Sunshine State Standards* and *Grade Level Expectations* in other subject areas. Research emphasizes the importance of connecting classroom learning to real-life situations. It is vital that the connections are relevant to students' lives and maintain the integrity of all subject areas addressed. In addition, the submitted materials, whenever feasible, should reflect and support content area standards in other subject areas. The Sunshine State Standards and Grade Level Expectations for those subjects can be accessed on the Florida Department of Education website, www.firn.edu/doe The course code

descriptions, included in this document on pages 52-210, provide the Technology Education Curriculum Frameworks.

The materials should include assessment materials that identify groups as well as individual learning and progress and suggest strategies for remediation and extension. They should be developmentally appropriate and lend themselves to assessing what students should know and be able to do as they develop their proficiency in various areas of Technology Education.

Parents, business, industry, government, the military, and community organizations are demanding better performance from all learners. Today's students must learn how to think, make decisions, work on teams, and continue to learn as well as read, write, and follow directions. Youth and adults entering or reentering the workplace must be equipped with necessary skills for the workplace. Education must enable children to become independent and successful in their future life and career goals.

Florida Addresses the Curriculum Needs of All Learners

Because Florida will not have a separate technology education call for special education students, publishers who submit technology education material for consideration will be required to incorporate strategies, materials, activities, etc. that consider the special needs of these students. In providing for students with special needs, Florida evaluators will be guided by the research reported in the document *Universal Design for Curriculum Access*. The following Web sites can be accessed for detailed information on this research:

<http://www.trace.wisc.edu/>

<http://www.cast.org>

<http://www.darkwing.uoregon.edu/~ncite/>

Accommodations and Modifications

The following summary of information from the Department of Education guide *Accommodations: Assisting Students with Disabilities* (1999) is of help in addressing the ways that materials may be developed or changed to meet the needs of students of varied abilities:

Accommodations are changes that are to be made to assure that students with disabilities can participate as fully as possible in the general curriculum.

Accommodations include, but are not limited to:

- not lessening achievement expectations.
- a wide range of techniques and support systems that help students with disabilities work around any limitations that result from their disability.

Examples include Braille textbooks or books on tape.

- meeting needs of one student but frequently helping other students in a classroom.

When a secondary student with a disability is enrolled in career and technical class with modification to the curriculum framework, the particular outcomes and student performance standards which the student must master to earn credit is specified on an individual basis.

Accommodations may be provided in five general areas:

- Instructional methods and materials
- Assignments and classroom assessments
- Time demands and scheduling
- Learning environment
- Use of special communication systems

Modifications may include:

- partial completion of program or course requirements
- curriculum expectations below age or grade level
- alternate assessment criteria
- alternate curricular goals

Instruction materials will be considered for adoption in each of the following Technology Education program areas:

1. **Integrated Technology Studies**
2. **Technology Systems**
3. **Communications Technology**
4. **Construction Technology**
5. **Drafting/Illustrative Design Technology**
6. **Electronics Technology**
7. **Materials and Processes Technology**
8. **Production Technology**

Publishers' Submissions

Florida will accept submissions from publishers for the following:

Integrated Technologies, Grades 6-9

Introduction to Technology
Exploring Technology
Exploration of Communications Technology
Exploration of Production Technology

Technology Systems, Grades 9-12

Communication Systems
Power and Transportation Systems
Production Systems
Drafting/Illustrative Design Systems
Electronics Systems
Engineering Systems
Applied Technology Systems
Home Technology Systems

Communications Technology, Grades 9-12

Communications Technology I
Communications Technology II
Communications Technology III

Construction Technology, Grades 9-12

Construction Technology I
Construction Technology II
Construction Technology III

Drafting/Illustrative Design Technology, Grades 9-12

Drafting/Illustrative Design Technology I
Drafting/Illustrative Design Technology II
Drafting/Illustrative Design Technology III

Electronics Technology, Grades 9-12

Electronics Technology I
Electronics Technology II
Electronics Technology III

Materials and Processes Technology, Grades 9-12

Materials and Processes Technology I
Materials and Processes Technology II
Materials and Processes Technology III

Production Technology, Grades 9-12

Production Technology I
Production Technology II
Production Technology III

General Description

Integrated Technology Studies, Grades 6-9

The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of the applications of technology and its effect upon our lives and the choosing of an occupation. The content and activities will also include the study of entrepreneurship, safety, and leadership skills. 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 emphasis of this program is on developing awareness of future needs, developing technological competence, confidence and awareness through interaction with technologies, developing awareness of other vocational programs, interacting with business, industry and community organizations, applying basic skills in learning activities, and developing self-awareness of individual abilities, needs and interests. The courses are intended to help students develop their problem-solving skills and creativity while learning about technology and careers. Students will learn to gather data through research and testing, as well as to record the results of their laboratory experiments.

The content includes introductory studies in areas of technology which introduce students to the development of abilities to calculate, make important observations, analyze and solve problems using manipulative skills while working cooperatively with others in team activities.

Listed below are the courses that make up this program at the secondary level:

Introduction to Technology
Exploring Technology
Exploration of Communications Technology
Exploration of Production Technology

Instructional materials should foster an understanding of the development of technology, the design process, terminology, career opportunities, and connections with other curricular areas. Submissions should include any related materials that can enhance the classroom experience, such as age-appropriate graphics and media.

The materials should include activities to promote interaction among students and be designed to include both classroom and laboratory activities, with emphasis placed on hands-on, problem solving experiences.

The instructional materials must address, but not be limited to, the intended outcomes of Florida's *Technology Education Curriculum Frameworks* and student performance standards contained therein for each of the specific courses (see Appendix A).

Technology Systems, Grades 9-12

The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of the applications of technology and its effect upon our lives and the choosing of an occupation. Students will be introduced to the concepts that underlie technological systems and the influence of technological systems at home, school, and the world of work. 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.

Listed below are the courses that make up this program at the secondary level:

Communication Systems
Power and Transportation Systems
Production Systems
Drafting/Illustrative Design Systems
Electronics Systems
Engineering Systems
Applied Technology Systems
Home Technology Systems

Instructional materials should foster an understanding of the development of technology, the design process, terminology, career opportunities, and connections with other curricular areas. Submissions should include any related materials that can enhance the classroom experience, such as age-appropriate graphics and media.

The materials should include activities to promote interaction among students and be designed to include both classroom and laboratory activities, with emphasis placed on hands-on, problem solving experiences.

The instructional materials must address, but not be limited to, the intended outcomes of Florida's *Technology Education Curriculum Frameworks* and student performance standards contained therein for each of the specific courses (see Appendix A).

Communications Technology, Grades 9-12

The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of communications 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.

Communications Technology represents the current and expanding digital technology. The content includes, but is not limited to a study of the processes, uses, and technical skills found in visual technologies (both conventional and digital procedures), multimedia production, computer animation and graphics, web page design, electronic media and other new and emerging technologies.

Listed below are the courses that make up this program at the secondary level:

Communications Technology I
Communications Technology II
Communications Technology III

Instructional materials should foster an understanding of the development of communications technology, the design process, appropriate terminology, career opportunities within the field of communications, and connections with other curricular areas. Submissions should include any related materials that can enhance the classroom experience, such as age-appropriate graphics and media.

The materials should include activities to promote interaction among students and be designed to include both classroom and laboratory activities, with emphasis placed on hands-on, problem solving experiences.

The instructional materials must address, but not be limited to, the intended outcomes of Florida's *Technology Education Curriculum Frameworks* and student performance standards contained therein for each of the specific courses (see Appendix A).

Construction Technology, Grades 9-12

The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of construction 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 the tools, materials, processes, and technical skills of construction technology. 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:

Construction Technology I
Construction Technology II
Construction Technology III

Instructional materials should foster an understanding of the development of construction technology, the design process, appropriate terminology, career opportunities within the field of construction, and connections with other curricular areas. Submissions should include any related materials that can enhance the classroom experience, such as age-appropriate graphics and media.

The materials should include activities to promote interaction among students and be designed to include both classroom and laboratory activities, with emphasis placed on hands-on, problem solving experiences.

The instructional materials must address, but not be limited to, the intended outcomes of Florida's *Technology Education Curriculum Frameworks* and student performance standards contained therein for each of the specific courses (see Appendix A).

Drafting/Illustrative Design Technology, Grades 9-12

The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of drafting and design 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 the purposes, instruments, processes, and technical skills of drafting technology, including technical drawing, mechanical design, architectural design, three-dimensional modeling, and engineering. 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:

Drafting/Illustrative Design Technology I
Drafting/Illustrative Design Technology II
Drafting/Illustrative Design Technology III

Instructional materials should foster an understanding of the development of drafting and illustrative design technology, the design process, appropriate terminology, career opportunities within the field of drafting and design, and connections with other curricular areas. Submissions should include any related materials that can enhance the classroom experience, such as age-appropriate graphics and media.

The materials should include activities to promote interaction among students and be designed to include both classroom and laboratory activities, with emphasis placed on hands-on, problem solving experiences.

The instructional materials must address, but not be limited to, the intended outcomes of Florida's *Technology Education Curriculum Frameworks* and student performance standards contained therein for each of the specific courses (see Appendix A).

Electronics Technology, Grades 9-12

The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of electronics 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, the theory, use, and technical application of electronics technology. 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:

Electronics Technology I
Electronics Technology II
Electronics Technology III

Instructional materials should foster an understanding of the development of electronics technology, the design process, appropriate terminology, career opportunities within the field of electronics, and connections with other curricular areas. Submissions should include any related materials that can enhance the classroom experience, such as age-appropriate graphics and media.

The materials should include activities to promote interaction among students and be designed to include both classroom and laboratory activities, with emphasis placed on hands-on, problem solving experiences.

The instructional materials must address, but not be limited to, the intended outcomes of Florida's *Technology Education Curriculum Frameworks* and student performance standards contained therein for each of the specific courses (see Appendix A).

Materials and Processes Technology, Grades 9-12

The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of the technology of materials and processes. 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 the pre-processing, processing, and post-processing of wood, metal, plastic, composites, and other materials. 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.

Materials and Processes Technology I
Materials and Processes Technology II
Materials and Processes Technology III

Instructional materials should foster an understanding of the development of materials and processes technology, the design process, manufacturing processes, material properties, appropriate terminology, career opportunities within the fields of manufacturing and materials sciences, and connections with other curricular areas. Submissions should include any related materials that can enhance the classroom experience, such as age-appropriate graphics and media.

The materials should include activities to promote interaction among students and be designed to include both classroom and laboratory activities, with emphasis placed on hands-on, problem solving experiences.

The instructional materials must address, but not be limited to, the intended outcomes of Florida's *Technology Education Curriculum Frameworks* and student performance standards contained therein for each of the specific courses (see Appendix A).

Production Technology, Grades 9-12

The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of production technology and its effect upon our lives and the choosing of an occupation.

This program focuses on transferable skills and stresses understanding and demonstration of the technological tools, machines, instruments, materials, processes and systems in manufacturing business and industry. 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:

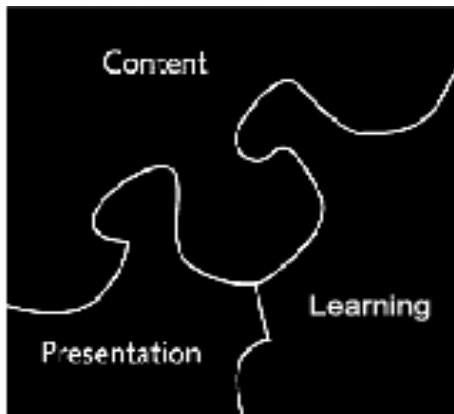
Production Technology I
Production Technology II
Production Technology III

Instructional materials should foster an understanding of the development of production technology, the design process, manufacturing processes, appropriate terminology, career opportunities within the field of manufacturing or production, and connections with other curricular areas. Submissions should include any related materials that can enhance the classroom experience, such as age-appropriate graphics and media.

The materials should include activities to promote interaction among students and be designed to include both classroom and laboratory activities, with emphasis placed on hands-on, problem solving experiences.

The instructional materials must address, but not be limited to, the intended outcomes of Florida's *Technology Education Curriculum Frameworks* and student performance standards contained therein for each of the specific courses (see Appendix A).

Major Priorities for Instructional Materials



The priorities as described in this specification document were developed from research findings about what makes instructional materials effective. These priorities have undergone review by individuals who have served on state and district committees, by curriculum specialists, by instructional designers, by evaluation specialists, and by administrators of the statewide adoption system.

Instructional materials must be effective in three major priority areas: content, presentation, and learning. The following sections describe essential features for each of these priority areas. These features generally apply to all formats of instructional materials, whether print or other media/multiple media formats.

Content



Some features of content coverage have received progressively more attention over the past decade. These features include:

ALIGNMENT WITH CURRICULUM REQUIREMENTS
LEVEL OF TREATMENT OF CONTENT
EXPERTISE FOR CONTENT DEVELOPMENT
ACCURACY OF CONTENT
CURRENTNESS OF CONTENT
AUTHENTICITY OF CONTENT
MULTICULTURAL REPRESENTATION
HUMANITY AND COMPASSION

FLORIDA STATUTES

1006.34(2)(b)—KEY WORDS: educational purpose... performance standards... instructional objectives... curriculum frameworks

1006.38—KEY WORDS: written correlations... curricular objectives... performance standards

1006.31(4)—KEY WORDS: curricular objectives... performance standards

1006.31—KEY WORDS: independent investigation

1003.42—KEY WORDS: adopted standards

The following sections describe the content features expected for each of these priority areas.

A. ALIGNMENT WITH CURRICULUM REQUIREMENTS

Content must align with the state's standards for the subject, grade level, and learning outcomes.

Correlations. Publishers are expected to provide correlation reports in the form provided by the Department of Education to

show exactly where and to what extent (mentioned or in-depth) the instructional materials cover each required standard.

Scope. The content must address Florida’s required curriculum standards for the subject, grade level, and learning outcomes, including thinking and learning skills.

Completeness. The content of the major tool must be complete enough to stand on its own. To be useful for classroom instruction, instructional materials must be adaptable to the instructional goals and course outlines for individual school districts, as well as the state standards. Content must have no major omissions in the required content coverage, and be free of unrelated facts and information that would detract from achievement of Florida’s specified grade level expectations.

B. LEVEL OF TREATMENT OF CONTENT

The level of complexity or difficulty of content must be appropriate for the standards, student abilities and grade level, and time periods allowed for teaching

Objectives. Content must match the intended objectives in complexity and technicality.

Students. Content must be developmentally appropriate for the age and maturity level of the intended students. It must contain sufficient details for students to understand the significance of the information presented and to engage in reflection and discussion.

Time. The level of complexity or difficulty of content also must allow for its coverage during the time periods available for teaching the subject.

C. EXPERTISE FOR CONTENT DEVELOPMENT

Expertise in the content area and in education of the intended students must be reflected in the authors, reviewers, and sources that contributed to the development of the materials.

Authorship. The authors, consultants, and reviewers must have actually contributed to the development of the instructional materials and must have credentials that reflect expertise in the subject area, course, course category, grade level, pedagogy,

FLORIDA STATUTES

1006.31(4)(e)(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

1006.34(2)(a)—KEY WORD: suitable

1006.34(2)(b)—KEY WORDS: the age of the children

1006.34(2)(b)—KEY WORDS: the degree to which the material would be supplemented or explained

education, teaching, or classroom instruction. Qualifications may include expertise in educational psychology or instructional design.

Sources. Primary and secondary sources must reflect expert information for the subject, such as relevant data from research, court decisions, diaries, autobiographies, artifacts, or historical sites.

D. ACCURACY OF CONTENT

Content must be accurate in historical context and contemporary facts and concepts. Note: For the subject area of Social Studies, the information presented must be accurate in historical content, have multicultural representation and offer contemporary facts and concepts.

FLORIDA STATUTES

1006.38—KEY WORDS:
free from all errors

1006.31(4)(e)(e)—KEY WORDS: accurate, objective

Objectivity. Content that is included in the materials must accurately represent the domain of knowledge and events. It must be factual and objective. It must be free of mistakes, errors, inconsistencies, and contradictions within itself, and biases of interpretation. It must be free of the biased selection of information. Materials must distinguish between facts and possible interpretations or opinions expressed about factual information. Visuals or other elements of instruction must contribute to the accuracy of text or narrative.

Representativeness. The selection of content must not misrepresent the domain of knowledge and events. It must include the generally accepted and prevalent truths, major concepts, standards, and models of the profession or discipline of the subject area.

Correctness. Presentation of content must be free of typographical and visual errors. It must include correct grammar, spelling, linguistics, terminology, definitions, descriptions, visuals, graphs, sounds, videos, and all other components of the instructional materials.

E. CURRENTNESS OF CONTENT

Content must be up-to-date for the academic discipline and the context in which the content is presented. Note: In the subject area of Social Studies, currentness of the instructional materials is essential for students to have a global perspective. It is encouraged that publishers' websites provide instruction in current events and issues.

Dates or editions. Copyright dates for photographs and other materials and editions must reflect currentness of content. Copyright dates and editions serve as indicators about currentness. However, neither the copyright date nor the edition guarantees currentness. In fact, second or third editions may or may not reflect more up-to-date information than first editions.

Informed examination of the text, narrative, and visuals contained in the materials must reveal the currentness of the materials.

Context. Text or narrative, visuals, photographs, and other features must reflect the time periods appropriate for the objectives and the intended learners.

- Sometimes context must be current. For example, a photograph used to show stages of human growth and development will be more relevant when the clothing, hairstyles, and activities reflect present-day styles.
- Sometimes context must be historical. For example, illustrations and photographs of historical events must reflect the historical time period.
- Sometimes context must be both current and historical. For example, historic images alongside modern ones would convey changes in styles over time.

F. AUTHENTICITY

Content must include problem-centered connections to life in a context that is meaningful to students. Note: In the subject area of Social

FLORIDA STATUTES

1006.37(1)(e)—KEY WORD: current

1006.38—KEY WORD: up-to-date

FLORIDA STATUTES

1006.31(e)—KEY WORDS: suited to the needs and comprehension of pupils

1006.31(4)(b)—KEY WORDS: humankind's place in ecological systems... conservation...dangerous substances

1003.42—KEY WORDS: civil government... functions and interrelationships

1003.42—KEY WORDS: effects...upon the human body and mind

1006.31(4)(b)—KEY WORDS: conservation of natural resources

Studies, publishers are encouraged to include primary and secondary materials for all appropriate content.

Life connections. Instructional materials must include connections to the student’s life situations in order to make the content more meaningful. Students might be expected to deal with time constraints, consider risks and trade-off in decision-making, and work with teams. Connections may be made to situations of daily home life, careers, vocation, community events and services, and leisure or recreation. Connections may include hopes and dreams, choices and activities.

Interdisciplinary treatment. Instructional materials also must include interdisciplinary connections in order to make content more meaningful. Examples of situations that connect a variety of subject areas include building projects, playing sports, finding information or objects, balancing budgets, creating products, and researching information. In addition to subject area connections, instructional materials must connect the course or course category to other disciplines.

Examples of approaches to interdisciplinary connections include:

- explanations and activities for using skills and knowledge from other academic disciplines
- assignments that require students to use collateral learning from other disciplines rather than isolated knowledge or skills
- the focus on common themes across several subject areas (infusion, parallel, transdisciplinary, or multidisciplinary instruction)

G. MULTICULTURAL REPRESENTATION

Portrayal of gender, ethnicity, age, work situations, and various social groups must include multicultural fairness and advocacy. Note: In the subject area of Social Studies, appreciation for all ethnic, racial, and cultural groups with a particular emphasis on those identified in Florida Statute 1003.42 is essential.

Multicultural fairness. It is not the number of pages devoted to diversity, equity, or work roles, but the substance of what is stated and portrayed that matters most. For this reason, it can be misleading to count the number of pages or illustrations devoted to a social issue or group. It is more important to focus on the integration of social diversity throughout a set of instructional materials.

Through balanced representation of cultures and groups in multiple settings, occupations, careers, and lifestyles, the materials must support equal opportunity without regard for age, color, gender, disability, national origin, race, or religion.

In addition to balanced representations, the portrayal of individuals and situations must exclude biases and stereotypes. These portrayals must promote an understanding and appreciation of the importance and contributions of diverse cultures and heritage.

Multicultural advocacy. The understanding and appreciation of multiple cultures extends beyond fair representation. It involves embracing a multicultural context, not just through pictures, but through information about ways to honor differences and deal with conflicts, promote a positive self-image for members of all groups, and provide for the development of healthy attitudes and values.

Effective treatment of multicultural issues requires consideration of the age and ability levels of students and whether or not it is appropriate to include multicultural issues in the study of a particular topic, such as the memorization of a formula or equation. Overall, however, materials must reflect both multicultural fairness and advocacy.

1003.42—KEY WORDS:
contributions of African
Americans...Hispanic
contributions...
women's contributions

**1006.31(4)(a) and
1006.341.—KEY WORDS:**
address the broad
racial, ethnic,
socioeconomic, and
cultural diversity of the
student population

H. HUMANITY AND COMPASSION

Portrayal of the appropriate care and treatment of people and animals must include compassion, sympathy, and consideration of their needs and values and exclude hard-core pornography and inhumane treatment.

FLORIDA STATUTES

1003.42—KEY WORDS:
to be a responsible and
respectful person

1003.42—KEY WORDS:
kindness to animals

1006.31(4)(c)—KEY WORDS:
humane treatment of
people and animals

1006.34(2)(b)—KEY WORDS:
age of the children

1006.34(2)(b)—KEY WORD:
pornography

Inclusion of compassion. When providing examples in narrative or visuals, materials sometimes depict the care and treatment of people and animals. Generally, this means showing in some way a measure of compassion, sympathy, or consideration of their needs and feelings.

Exclusion of inhumanity. In the context of personal and family values, Florida expressly prohibits material containing *hard-core pornography*. In addition, although the definition of *inhumane treatment* can sometimes appear to be controversial, as in science research, there is general agreement that instructional materials must not advocate any form of inhumane treatment.

As with the evaluation of multicultural representation, it is important to consider the context of the subject and the age and abilities of the students.

REFERENCES FOR CONTENT FEATURES

*For a complete list of references and citations, please refer to **Destination: Florida Classrooms—Evaluator’s Handbook**, or request a list of references from the Department of Education, Bureau of Curriculum, Instruction, and Assessment.*



Presentation

Features of presentation affect the practical usefulness of materials and the ease of finding and understanding content. These features include:

COMPREHENSIVENESS OF STUDENT AND TEACHER RESOURCES
ALIGNMENT OF INSTRUCTIONAL COMPONENTS
ORGANIZATION OF INSTRUCTIONAL MATERIALS
READABILITY OF INSTRUCTIONAL MATERIALS
PACING OF CONTENT
EASE OF USE OF MATERIALS

The following sections describe the presentation features expected for each of these areas.

A. COMPREHENSIVENESS OF STUDENT AND TEACHER RESOURCES

Resources must be complete enough to address the targeted learning outcomes without requiring the teacher to prepare additional teaching materials for the course. Note: For the subject area of Social Studies, the following types of student and teacher resources and methods are particularly important. They help a teacher's transition from the lecture-oriented teaching model to a coaching and mentoring mode. This encourages students to become informed, information literate and actively involved in their community, nation, and world.

- Art, literature, and music
- Simulation software and activities
- Primary sources
- Secondary sources
- Audiotapes, videotapes, websites significant to the study of Social Studies

FLORIDA STATUTES

1006.34(2)(a)—KEY WORDS:
suitable, usable

1006.34(2)(b)—KEY WORDS:
the degree to which the material would be supplemented or explained

- Shared, guided, and independent readings of nonfiction and historical fiction
- Activities that provide the development of geography skills with regards to reading and interpreting maps, charts, and graphs
- Activities that require research using a variety of print, nonprint, and electronic sources
- Activities that support the goals of multicultural education, especially as they relate to African-American history, the Holocaust, Hispanic studies, and women's history requirements
- Activities that promote civic responsibility and civic participation
- Activities that develop a global perspective; and
- Activities that encourage the use of current technology

Materials must contain support for students in completing instructional activities and assessments and for teachers in implementing all of the instructional elements. A variety of components can accomplish this purpose. Typically, materials will include test items, study guides, outlines and strategies for teaching, media supplements, learning activities, and projects.

The major components generally expected for student and teacher resources are listed below.

Student resources. Student materials typically include the major text or program with text or narration, visuals, assignments, and assessments. Formats may include print, audio, visual, computer, or other media.

Effective instructional materials generally integrate the use of reference aids (e.g., index, glossary, maps, bibliography, graphic organizers, and pictures) with the topic being studied. Items that guide students through materials might include clearly labeled materials, directions and explanations, and assignments with different options and choices.

Review and practice activities might include participation activities such as simulations, role-playing situations, investigations, and hands-on practice assignments. Review activities might include self-checks or quizzes. Formats might include worksheets, workbooks, journals, lab books, lab logs, charts, or maps. Feedback might be in the form of answer keys in student materials or in teacher materials.

Review works best as a logical extension of content, goals, objectives, and lessons, with increased similarity to real-life situations. Review activities must require students to recall or apply previously taught knowledge and skills. Frequent short reviews over time or space improve learning more than a concentrated review. Assignments and stages of short practice improve speed and accuracy.

Other components might include enrichment and remediation activities, additional resources, and tests and assessment tools either in the student materials or in the teacher's guide or edition.

Teacher resources. Teacher materials typically include a teacher's edition with the annotated student text and copies of supplementary written materials with answer keys, worksheets, tests, diagrams, etc., so that the teacher has to use only one guide. Publishers may make available inservice training, workshops, or consulting services to support teachers in implementing instructional materials. However, teachers and administrators tend to favor materials that do not require extensive training.

Support, guidelines, resources, or features such as the ones described below help teachers to effectively implement materials in classroom and school settings.

(1) **Components and materials that are easy to use:** Examples include clearance, license, or agreement for copying and use of materials; clear description and accurate directions for use of required equipment, facilities, resources, and environment; clearly labeled grade, lesson, content, and other information to identify components; correct specifications for making media and electronic programs work effectively.

(2) **Materials to support lesson planning, teaching, and learning:** Examples include overview of components and objectives; background for lectures and discussions; technical terminology, and reinforcement and review strategies; scope and sequence chart for activities and planning; sample lesson plans; suggestions for individualized study, small-group and large-group presentations and discussions, school-to-work activities, field or laboratory experiences, and other extension activities; suggestions for integrating themes across the subject area or course curriculum and forming connections to other disciplines;

suggestions for parental and community involvement; cultural highlights to explain and expand on the materials.

(3) **Suggestions for adapting instruction for varying needs:** Examples include alternative approaches to teaching, pacing, and options for varied delivery of instruction such as media, tools, equipment, and emerging technology; strategies for engaging all students, such as open-ended questions to stimulate thinking, journals, manipulatives, explorations, and multisensory approaches; suggestions for addressing common student difficulties or adapting to multiple learning styles; and alternative reteaching, enrichment, and remediation strategies.

(4) **Guidelines and resources on how to implement and evaluate instruction:** Examples include answers to work assignments, practice activities, and tests; possible outcomes of projects or research; suggestions for using learning tasks for classroom assessment; guidelines for alternative assessments, such as sample checklists, peer or performance assessments, portfolios, or projects.

(5) **Resources to use in classroom activities:** Examples include copy masters to use for displays or photocopies; bibliographies or lists of resources and references, including network resources; classroom management strategies and documentation on the manageability of the entire instructional program; in-service workshop or consultation support from the publisher.

FLORIDA STATUTE

1006.29(4)—KEY
WORDS:
instructional
materials... major
tool...instruction of
a subject or course

B. ALIGNMENT OF INSTRUCTIONAL COMPONENTS

All components of an instructional package must align with each other, as well as with the curriculum.

All components of an instructional package—teacher’s edition and materials, student’s edition and materials, workbook, supplementary materials, and others—must be integrated and interdependent and must correspond with each other. For example, master copies of handouts in a teacher’s edition must align with student activities or assignments. They must match in content and progression of instructional activities.

C. ORGANIZATION OF INSTRUCTIONAL MATERIALS

The structure and format of materials must have enough order and clarity to allow students and teachers to access content and explicitly identify ideas and sequences.

Providing an explicit and teachable structure can double the amount of information remembered. Clear organization allows students and teachers to discriminate important pieces of information through skimming, reading, or browsing.

Clear organization may be accomplished through a combination of features, but generally not through one feature alone.

Access to content. Some features help in searching and locating information, such as a table of contents; menu or map of content; directions on how to locate information or complete assignments; an index for quick reference; goals and/or objectives, outlines, lists, or checklists for major sections; bibliographies and lists of resources; glossaries for quick access to major terms; introductions, key concepts and themes, visual cues, illustrations, labeled examples, and labeled reviews or summaries.

Visible structure and format. Other at-a-glance features signal the organization of content, such as chapter or unit titles and/or frames; headings and subheadings; typographic cues such as bold, italics or changes in size of type; divisions of content such as borders, boxes, circles, highlighting, visual signposts, icons, or color cues; diagrams, labels, and visuals placed near the related content; and numbering of pages and other components.

Objectives or a content outline may serve a similar purpose by introducing main ideas, providing guideposts to use in searching for key information, or serving as a checklist for self-assessment.

Certain types of brief narrative sections also contribute to clear organization. For example, the statement of a clear purpose with content organized around main ideas, principles, concepts, and logical relationships supports the unity and flow of information. Introductions also play a major role when they include anchoring ideas, a list of key points, or conceptual schemes such as metaphors. Summaries also can assist students in understanding the logical order of topics presented.

Logical organization. The pattern of organization of the content must be consistent and logical for the type of subject or topic. Patterns of organization may include comparison and contrast,

FLORIDA STATUTES

1006.34(2)(a)—KEY WORD:
usable

1066.34(2)(b)—KEY WORD:
degree to which the material would be supplemented and explained

time sequence, cause-effect or problem-solution-effect, concrete to abstract, introduction-review-extension (spiral structure), simple-to-complex, whole-part or part-whole, generalization-examples-review-practice, and conflict-inside view-structure.

D. READABILITY OF INSTRUCTIONAL MATERIALS

FLORIDA STATUTES

1006.31(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

1006.34(2)(a)—KEY WORDS: suitable, usable, desirable

1006.34(2)(b)—KEY WORDS: the age of the children

Narrative and visuals must engage students in reading or listening as well as in understanding of the content at a level appropriate to the students' abilities.

Language style. Language style and visual features can influence the readability of materials. Yet, a popular tool for assessing readability has been the use of a *readability formula* of one type or another. These formulas tend to focus only on a few *countable* characteristics of language style such as the length of words, sentences, and/or paragraphs.

Other features are more important in establishing the readability of instructional materials, such as:

- organized, coherent text
- language and concepts familiar to the student
- language that clarifies, simplifies, and explains information
- transition words such as “yet,” “also,” “next,” “for example,” “moreover,” or “however”
- other phrases that create logical connections
- words with concrete and specific images
- active rather than passive voice
- varied sentence structures, which avoid both choppy sentences and unnecessary words
- specific questions or directions to guide student attention to visuals or key information

Visual features. Visual features that improve readability include

- print that is dark and clear, with good contrast
- paper with clean-cut edges without glare, or computer screens without glare
- margins wide enough on a page or screen to allow easy viewing of the text

- visuals that are relevant, clear, vivid, and simple enough for students to understand
- quantity of visuals suitable for the intended students—both lower ability students and higher ability students tend to require more visuals
- unjustified text (ragged on the right) rather than justified (lined up on the right)
- visuals that contain information in a form different from the text
- graphs, charts, maps, and other visual representations integrated at their point of use
- colors, size of print, spacing, quantity, and type of visuals suitable for the abilities and needs of the intended students

E. PACING OF CONTENT

The amount of content presented at one time or the pace at which it is presented must be of a size or rate that allows students to perceive and understand it. Note: Work required of students in advanced, honors, and advanced placement level courses must be observably more comprehensive and at a higher level than the work required of students in regular classes.

It is important that materials contain “bite-size” chunks or blocks of information. The chunks must not be so large, nor the pacing so fast, as to overwhelm students. Neither must the chunks be so small, nor the pacing so slow, as to bore them.

FLORIDA STATUTES

1006.31(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

1006.34(2)(a)—KEY WORD: suitable

1006.34(2)(b)—KEY WORDS: the age of the children

FLORIDA STATUTES

1006.29(4)—KEY

WORDS:

instructional materials... major tool...instruction

1006.38(3)(a)—KEY

WORDS: specifications of the physical characteristics

1006.34(2)(a)—KEY

WORDS: suitable, usable, desirable

1006.34(2)(b)—KEY

WORDS: the age of the children

1006.34(2)(b)—KEY

WORDS: the degree to which the material would be supplemented or explained

1006.38(5)—KEY

WORDS: not to exceed the lowest price

1006.38(6)(7)(8)(9)—

KEY WORDS:

reduce automatically...free of charge...equal in quality...supplementar

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F. EASE OF USE OF MATERIALS

Both print and other media formats of instructional materials must be easy to use and replace and be durable enough for multiple uses over time.

Warranty. The actual physical and technical qualities of materials must match the description contained in the publisher's warranty.

Use. Materials must be designed for practical use in the classroom and school environments. They must be easy to identify and store. Teachers and students must be able to access and use the materials. Some of the factors influencing their ease of use include number of components, size of components, packaging, quality of materials, equipment requirements, and cost to purchase or replace components.

The best choice about weight, size, and number of volumes depends on several factors, such as the organization of the content, how well separate volumes may fit time periods for instruction, and the ages of students. Technical production requirements, such as page limits or different types of bindings, may lead to multiple volumes.

Examples of classroom use include repeated copying of consumable materials and repeated use of other materials by students over time. Students must be able to easily use the materials and take home, in a convenient form, most of the material they need to learn for the course.

Technology-rich resources must work properly and run without error. Electronic media for student use must be encoded to prevent accidental or intentional erasure or modification. As with textbooks, electronic media must allow students to easily access and interact with them without extensive supervision or special assistance.

The physical and technical qualities of materials must match with the resources of the schools. Materials such as videos, software, CD-ROMs, Internet sites, and transparencies may serve instructional purposes well, but have little value unless they can be implemented with the school's equipment. Sometimes, a publisher provides training, inservice, or consultation to help in effective use of the materials.

Durability. Students and teachers must be able to have materials that will be durable under conditions of expected use. For example, boxes, books, or other materials must not fall apart after normal classroom use. The packaging and form of materials must be flexible and durable enough for multiple uses over time. Durability includes considerations such as

- high-quality paper, ink, binding, and cover
- back, joints, body block, and individual pages
- worry-free technology that runs properly, with easy to hear, see, and control audio and visuals, and
- the publisher’s guarantee for replacement conditions and agreements for reproduction needed to effectively use the materials

Cost. *Florida’s Department of Education Commissioner will consider the impact of cost in making final decisions.* Cost, while not a direct factor in ease of use, influences the ease with which materials can be obtained or replaced. The impact of cost can be complex to estimate. It requires considering the number of materials available at no additional cost with the purchase of the major program or text, the cost over the adoption period of several years, and the number of free materials to support implementation. Attractive features such as higher quality paper and visuals and greater use of color may escalate cost, without enhancing learning effectiveness.

REFERENCES FOR PRESENTATION FEATURES

For a complete list of references and citations, please refer to **Destination: Florida Classrooms—Evaluator’s Handbook**, or request a list of references from the Department of Education, Bureau of Curriculum, Instruction, and Assessment.



Learning

The following features have been found to promote learning and apply to most types of learning outcomes.

MOTIVATIONAL STRATEGIES
TEACHING A FEW “BIG IDEAS”
EXPLICIT INSTRUCTION
GUIDANCE AND SUPPORT
ACTIVE PARTICIPATION
TARGETED INSTRUCTIONAL STRATEGIES
TARGETED ASSESSMENT STRATEGIES

The following sections describe the learning features expected for each of these priority areas.

FLORIDA STATUTES

1006.31(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

1006.34(2)(a)—KEY WORDS: suitable, usable, desirable

1006.34(2)(b)—KEY WORDS: the age of the children

1006.38(4)—KEY WORDS: diagnostic, criterion-referenced

A. MOTIVATIONAL STRATEGIES

Instructional materials must include features to maintain learner motivation.

Expectations. Materials must positively influence the expectations of students. Examples include:

- positive expectations for success
- novel tasks or other approaches to arouse curiosity
- meaningful tasks related to student interests, cultural backgrounds, and developmental levels

- activities with relevance to the student’s life
- thought-provoking challenges such as paradoxes, dilemmas, problems, puzzles, controversies, and questioning of traditional ways of thinking
- challenges that are neither too difficult to achieve nor so easy that students become bored
- hands-on tasks in a concrete context, and images, sounds, analogies, metaphors, or humorous anecdotes
- variety, including the opportunity for students to ask their own questions, set their own goals, and make other choices during learning

Feedback. Materials must include informative and positive feedback on progress. Examples include:

- frequent checks on progress, including testing
- explanatory feedback with information about correctness of responses, how to avoid or correct common mistakes, and/or different approaches to use
- varied forms of assessments (self-assessment, peer assessment, and some learning tasks without formal assessments)

Appearance. Materials must have an appearance generally considered attractive to the intended students.

B. TEACHING A FEW “BIG IDEAS”

Instructional materials must thoroughly teach a few important ideas, concepts, or themes.

Focus. Thoroughly teaching a few big ideas provides focus for the learner’s attention. It provides an organizing framework for integrating new information.

Completeness. The thorough teaching of a few big ideas may focus on developing a deeper and more complete understanding of the major themes of a discipline, the content of the subject area, relationships to other disciplines, and the thinking and

FLORIDA STATUTES

1006.31(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

1006.34(2)(a)—KEY WORDS: suitable, usable

1006.34(2)(b)—KEY WORDS: educational purpose

learning skills required for achieving the specified learning outcomes.

Note: For the subject area of Social Studies, the “Big Ideas” are:

- *Geographic Understanding* – emphasizing the fundamental theme of geography (location, place, human-environment interactions, movement, regions);
- *Historical Awareness* – focusing on the processes, people, major events, eras, and personalities of history;
- *Civic Responsibility* – emphasizing democratic values and principles and the importance of citizenship participation
- *Economic Understanding* – focusing on the basic concepts, principles, and practices of economics;
- *Cultural Awareness* – developing an appreciation of individual and racial, ethnic, and cultural differences; and
- *Global Perspective* – developing an awareness of the interdependent nature of the world.

FLORIDA STATUTES

1006.31(e)—KEY
WORDS: suited to the needs and comprehension of pupils at their respective grade levels

1006.34(2)(a)—KEY
WORDS: suitable, usable

1006.34(2)(b)—KEY
WORDS: educational purpose

C. EXPLICIT INSTRUCTION

Instructional materials must contain clear statements of information and outcomes.

Clarity of directions and explanations. To support success in learning, instructional materials must include clear presentation and explanations of:

- purposes, goals, and expected outcomes
- concepts, rules, information, and terms
- models, examples, questions, and feedback

For example, development of specific thinking skills requires an explicit statement of the particular *thinking skills* to be learned, along with the *strategies* or *steps to follow*. Explicit instruction for thinking skills might also involve showing *examples* of successful thinking processes contrasted with examples of poor thinking processes.

Similarly, the development of learning skills requires explicit directions about *when* and *how* to do activities such as notetaking, outlining, paraphrasing, abstracting and analyzing, summarizing, self-coaching, memory strategies, persistence, preview and questioning, reading and listening, reflecting, and reciting.

Exclusion of ambiguity. Instructional materials must avoid terms and phrases with ambiguous meanings, confusing directions or descriptions, and inadequate explanations.

Note: For the subject area of Social Studies, explicit instruction is particularly important in developing the skills necessary for reading and interpreting maps, charts, and graphs and understanding the difference between fact and opinion, and different points of view, especially in light of the explosion of the Internet.

D. GUIDANCE AND SUPPORT

Instructional materials must include guidance and support to help students safely and successfully become more independent learners and thinkers.

Level. The type of guidance and support that helps students to become more independent learners and thinkers is sometimes referred to as *scaffolding*. Scaffolding is a solid structure of support that can be removed after a job has been completed. As students gain proficiency, support can diminish, and students can encounter more complex, life-centered problems. Information and activities must provide guidance and support at the level that is needed—no more and no less. Too much can squelch student interest, and too little can lead to failure.

Guidance and support can be accomplished by a combination of the following features:

- organized routines
- advance organizers or models such as:
 - (1) condensed outlines or overviews
 - (2) simplified views of information
 - (3) visual representations of new information during initial instruction
 - (4) sample problems
 - (5) questions to focus on key ideas or important features
 - (6) examples of solved problems
 - (7) explanations of how the problems were solved
 - (8) examples of finished products or sample performances
 - (9) analogies, metaphors, or associations to compare one idea to another
- prompts or hints during initial practice

FLORIDA STATUTES

1006.31(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

1006.34(2)(a)—KEY WORDS: suitable, usable, desirable

- step-by-step instructions
- immediate and corrective feedback on the accuracy of performance of each step or task, on how to learn from mistakes, and on how to reach the correct answer
- simulations with features for realistic practice
- opportunities for students to do research, and to organize and communicate results

Adaptability. Guidance and support must be adaptable to developmental differences and various learning styles. For example, young children tend to understand concepts in concrete terms and overgeneralize new concepts. Some students need more time, some tend to be more impulsive than reflective, some have trouble distinguishing relevant from irrelevant information, and some have better written than spoken language skills.

Approaches for developmental differences and learning styles of students, include

- a variety of *activities* such as:
 - (1) structured and unstructured activities
 - (2) independent and group work
 - (3) teacher-directed and discovery learning
 - (4) visual and narrative instruction
 - (5) hands-on activities
 - (6) open-ended activities
 - (7) practice without extrinsic rewards or grades
 - (8) simple, complex, concrete, and abstract examples
 - (9) variable pacing or visual breaks

- A variety of *modalities* for the various multiple intelligences of students, such as:
 - (1) linguistic-verbal
 - (2) logical-mathematical
 - (3) musical
 - (4) spatial
 - (5) bodily-kinesthetic
 - (6) interpersonal
 - (7) intrapersonal

Note: The subject area of Social Studies, the following forms of guidance and support are particularly important:

- Multiple opportunities for responding to critical thinking and problem solving appropriate to the discipline;
- Thematic networks of knowledge;
- Incorporation of authentic activities and assessments;
- Cross-disciplinary boundaries; and
- Research activities that will help students become information literate.

E. ACTIVE PARTICIPATION OF STUDENTS

Instructional materials must engage the physical and mental activity of students during the learning process.

Assignments. Instructional materials must include organized activities of periodic, frequent, short assignments that are logical extensions of content, goals, and objectives.

Student responses. Assignments must include questions and application activities during learning that give students opportunities to respond. Active participation of students can be accomplished in a variety of ways. For example, information and activities might require students to accomplish the types of activities listed below.

- respond orally or in writing
- create visual representations (charts, graphs, diagrams, and illustrations)
- generate products
- generate their own questions or examples
- think of new situations for applying or extending what they learn
- complete discovery activities
- add details to big ideas or concepts from prior knowledge
- form their own analogies and metaphors
- practice lesson-related tasks, procedures, behaviors, or skills
- choose from a variety of activities

Note: For the subject area of Social Studies, the following features are particularly important to engage students effectively:

- Opportunities for students to engage in Social Studies instruction in ways other than just the written/spoken word (i.e. simulations, interactive programs, etc.)

FLORIDA STATUTES

1006.31(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

1006.34(2)(a)—KEY WORDS: suitable, usable, desirable

- Opportunities for students to create products in a variety of ways for a variety of audiences; and
- Opportunities for students to become information literate.

FLORIDA STATUTES

1006.31(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

1006.34(2)(a)—KEY WORDS: suitable, usable, desirable

1006.34(2)(b)—KEY WORDS: the age of the children

1003.42 KEY WORDS: approved methods of instruction

F. TARGETED INSTRUCTIONAL STRATEGIES

Instructional materials must include the strategies known to be successful for teaching the learning outcomes targeted in the curriculum requirements.

Alignment. Research has documented the strategies that effectively teach different types of learning outcomes. The learning strategies included in instructional materials must match the findings of research for the targeted learning outcomes. Different types of learning outcomes require different strategies. For example, a strategy for memorizing verbal information might be helpful, but it would not align with the strategies required for learning a concept or for learning how to solve a problem.

Completeness. Not only must strategies be aligned, but they also must be complete enough to effectively teach the targeted outcomes. For example, while the explanation of a problem-solving method or model would be appropriate, other strategies also would be necessary in order for students to learn how to resolve different types of problems.

Research summary. Researchers sometimes use different terms for some similar outcomes. For example, *thinking skills* and *metacognition* refer to some of the same types of skills. The following alphabetical list includes terms as they have appeared in research, even though some terms clearly overlap others.

- attitudes
- cognitive strategies
- comprehension/
understanding
- concepts
- creativity
- critical thinking
- insight
- metacognition
- motor skills
- multiple intelligences
- problem solving
- procedural knowledge,
principles, and rules
- scientific inquiry
- thinking skills
- verbal information,
knowledge, or facts

The following section summarizes the research findings for each of these types of learning outcomes.

Effective Teaching Strategies

- **To teach *Attitudes*—for example, learning the benefits of reading**
 - Explain and show consequences of choices, actions, or behaviors.
 - Provide relevant human or social models that portray the desired choices, actions, or behaviors
- **To teach *Cognitive Strategies* (learning how to learn)—for example, self-monitoring and reflecting upon the effectiveness of the reading process selected and used**
 - Encourage or teach (a) organizing and summarizing information; (b) self-questioning, self-reflection, and self-evaluation; and (c) reference skills.
 - Encourage or teach when and how to use these different skills.
- **To teach *Comprehension/Understanding*—for example, comprehending and understanding information in a reading selection**

- Outline, explain, or visually show what will be learned in a simple form.
- Explain with concrete examples, metaphors, questions, or visual representations.
- Require students to relate new to previously learned information.
- Require students to paraphrase or summarize new information.
- Require students to construct a visual representation of main ideas (map, table, diagram, etc.).
- Give students opportunities to add details, explanations, or examples to basic information.
- Require application of knowledge or information.
- **To teach *Concepts*—for example, learning the concepts of figurative language, metaphors, and similes**
 - Provide clear definition of each concept.
 - Point out important and unimportant features or ideas.
 - Point out examples and non-examples of the concept, showing similarities and differences.
 - Include practice in classifying concepts.
 - Include a wide range of examples in progressive presentation of more complex examples.
 - Emphasize relationships between concepts.
- **To teach *Creativity*—for example, exploring different types of reading selections and sources or creating an evaluation tool to identify the impact of mood or meaning**
 - Provide examples of creativity.
 - Include models, metaphors, and analogies.
 - Encourage novel approaches to situations and problems.
 - Show and provide practice in turning a problem upside down or inside out or changing perceptions.
 - Encourage brainstorming.
 - Include questions and problems with multiple answers.
 - Provide opportunities of ungraded, unevaluated creative performance and behavior.
- **To teach *Critical Thinking*—for example, differentiating fact from opinion or determining the validity of arguments**
 - Create conflict or perplexity by using paradoxes, dilemmas, or other situations to challenge concepts, beliefs, ideas, and attitudes.

- Focus on how to recognize and generate proof, logic, argument, and criteria for judgments.
 - Include practice in detecting mistakes, false analogies, relevant v. irrelevant issues, contradictions, “buggy” algorithms, and predictions.
 - Provide practice in drawing inferences from observations and making predictions from limited information.
 - Explain and provide practice in recognizing factors that influence choice and interpretations such as culture, experience, preferences, desires, interests, and passions, as well as systematic thinking.
 - Require students to explain how they form new judgments and how and why present judgments differ from previous ones.
- **To teach *Insight*—for example, comprehending the symbols in literary works**
 - Include inquiry and discovery activities.
 - Provide challenging thinking situations with concrete data to manipulate.
 - Promote careful observation, analysis, description, and definition.
- **To teach *Metacognition* (learning how to think)—for example, rereading and self-correcting**
 - Explain different types of thinking strategies and when to use them.
 - Encourage self-evaluation and reflection.
 - Include questions to get students to wonder why they are doing what they are doing.
 - Guide students in how to do systematic inquiry, detect flaws in thinking, and adjust patterns of thinking.
- **To teach *Motor Skills*—for example, writing legibly or using electronic tools proficiently**
 - Provide a mental and physical model of desired performance.
 - Describe steps in the performance.
 - Provide practice with kinesthetic and corrective feedback (coaching).
- **To teach *Multiple Intelligences*—for example, retelling vs. rewriting or learning certain rhythms**

- Verbal-linguistic dimension focuses on reasoning with language, rhythms, and inflections, such as determining meaning and order of words (stories, readings, humor, rhyme, and song).
- Logical-mathematical dimension focuses on reasoning with patterns and strings of symbols (pattern blocks, activities to form numbers and letters).
- Musical dimension focuses on appreciation and production of musical pitch, melody, and tone.
- Spatial dimension focuses on activities of perceiving and transforming perceptions.
- Bodily kinesthetic dimension focuses on use and control of body and objects.
- Interpersonal dimension focuses on sensing needs, thoughts, and feelings of others.
- Intrapersonal dimension focuses on recognizing and responding to one's own needs, thoughts, and feelings.
- **To teach *Problem Solving*—for example, forming predictions, inferences, logical endings, or conclusions**
 - Assure student readiness by diagnosing and strengthening related concept, rule, and decision-making skills.
 - Provide broad problem-solving methods and models.
 - Include practice in solving different types of problems.
 - Begin with highly structured problems and then gradually move to less structured ones.
 - Use questions to guide thinking about problem components, goals, and issues.
 - Provide guidance in observing and gathering information, asking appropriate questions, and generating solutions.
 - Include practice in finding trouble, inequities, contradictions, or difficulties and in reframing problems.
 - Include drill and practice to improve speed, consistency, and ease of using problem-solving steps.

- **To teach *Procedural Knowledge, Principles, and Rules*—for example, determining when and how to use alphabetical and numerical systems for organizing information**
 - Define context, problems, situations, or goals for which procedures are appropriate.
 - Explain reasons that procedures work for different types of situations.
 - Define procedures—procedures include rules, principles, and/or steps.
 - Provide vocabulary and concepts related to procedures.
 - Demonstrate step-by-step application of procedures.
 - Explain steps as they are applied.
 - Include practice in applying procedures.
- **To teach *Scientific Inquiry*—for example, transferring information gathered and recorded into a formal presentation**
 - Explain process and methods of scientific inquiry.
 - Explain and provide examples of (a) typical solution procedures, (b) how to form hypotheses, (c) how to speculate, and (d) how to identify and interpret consequences.
 - Encourage independent thinking and avoidance of dead ends or simplistic answers.
 - Require students to explain experiences with inquiry activities and results of inquiry activities.
- **To teach *Thinking Skills* (also refer to critical thinking and metacognitive skills)—for example, comparing and contrasting ideas**
 - Introduce different types of thinking strategies.
 - Explain context or conditions of applying different strategies.
 - Provide definitions, steps, and lists to use in strategies.
 - Include examples of different types of thinking strategies, including how to think with open-mindedness, responsibility, and accuracy.

- Emphasize persistence when answers are not apparent.
- Provide practice in applying, transferring, and elaborating on thinking strategies.
- Integrate metacognitive, critical, and creative-thinking skills.
- **To teach *Verbal Information, Knowledge, or Facts*—for example, new vocabulary or labels**
 - Provide a meaningful context to link new information and past and/or future knowledge.
 - Organize information into coherent groups or themes.
 - Use devices to improve memory such as mnemonic patterns, maps, charts, comparisons, groupings, highlighting of key words or first letters, visual images, and rhymes.
 - Include some overlearning and mastery through practice in rehearsal, recall, or restatement of information (refer to *comprehension*).
 - Point out parts, main ideas, pattern, or relationships within information or sets of facts.

FLORIDA STATUTES

1006.31(e)—KEY WORDS: suited to the needs and comprehension of pupils at their respective grade levels

1006.34(2)(a)—KEY WORDS: suitable, usable, desirable

1006.34(2)(b)—KEY WORDS: the age of the children

1006.38(4)—KEY WORDS: diagnostic, criterion-referenced

G. TARGETED ASSESSMENT STRATEGIES

Instructional materials must include assessment strategies that are known to be successful in determining how well students have achieved the targeted learning outcomes.

Alignment. The assessment strategies must match the learner performance requirements for the types of learning outcomes that have been targeted for the subject matter, course, or course category. Different strategies are appropriate for assessing different types of learning outcomes. For example, a strategy for testing the acquisition of verbal information would not match the requirements for testing whether or not a student has learned a concept or learned how to solve a problem.

The term “assessment,” as used in this section refers to testing or other strategies that assess student progress as a result of learning activities. The results of such assessment provide information about where to strengthen instruction. But it is very

important to ask the right questions. If the type of question matches the type of learning outcome, then students and teachers have relevant information about learning progress.

Completeness. In addition to including assessment strategies that align with the performance requirements of the targeted learning outcomes, the strategies must be complete enough to effectively assess the learner's performance requirements required by the targeted learner outcomes. For example, a test item that requires the student to state a rule does not assess whether or not the student knows how to *use* the rule.

Research summary. The research summary for effective assessment strategies for different types of learning outcomes follows the same alphabetical sequence as the previous section.

Effective Assessment Strategies

- **To assess *Attitudes*:**
 - Provide various situations.
 - Require choices about behaviors.
- **To assess *Cognitive Strategies*:**
 - Provide learning tasks.
 - Require students to choose good strategies for learning and/or to learn new materials without teacher guidance.
 - Require students to discuss and explain methods used for various learning tasks.
- **To assess *Comprehension/Understanding*:**
 - Provide topic.
 - Require summary or restatement of information.
 - Provide new context.
 - Require application of information.
 - Provide several statements using words different from the initial teaching.
 - Require identification of the correct meaning.
- **To assess *Concepts*:**
 - Provide new examples and non-examples.
 - Require identification or classification into the correct categories.
- **To assess *Creativity*:**

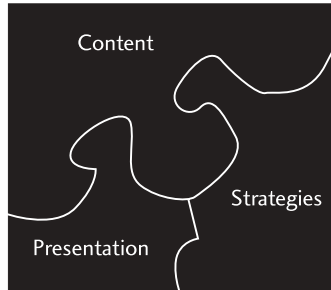
- Provide new problems to “turn upside down,” study, or resolve—these could be puzzles, dance performances, drama performances, or products to create.
- Require products or solutions to fit within the particular functions and resources.
- Provide situations requiring novel approaches.
- **To assess *Critical Thinking*:**
 - Require students to evaluate information or results.
 - Require the use of analysis and research.
- **To assess *Insight*:**
 - Provide situations for inquiry and discovery.
 - Provide situations for manipulation.
- **To assess *Metacognition* (learning how to think):**
 - Provide different situations or problems.
 - Require students to identify types of thinking strategies to analyze and evaluate their own thinking.
- **To assess *Multiple Intelligences*:**
 - Provide situations in the modality that is targeted, e.g., verbal-linguistic, musical, or other modality.
 - Provide situations in several modalities, to allow choice
 - Require performance in the targeted or chosen modalities.
- **To assess *Motor Skills*:**
 - Provide situations and resources for performance of the skill.
 - Include checklist for evaluation.
- **To assess *Problem Solving*:**
 - Require students to choose types of problem-solving strategies for different situations.
 - Require solutions to structured and unstructured, simple and complex problems.
- **To assess *Procedural Knowledge, Principles, and Rules*:**
 - Provide situations that require students to recognize the correct use of procedures, principles, or rules with routine problems.
 - Require students to state procedures, principles, or rules.
 - Require students to choose which ones to apply in different situations.

- Provide situations that require students to demonstrate the correct use of procedures, principles, or rules with routine problems.
- **To assess *Scientific Inquiry*:**
 - Provide situations or problems that require speculation, inquiry, and hypothesis formation.
 - Provide research, hands-on activity, and conclusions.
- **To assess *Thinking Skills*** (also refer to critical thinking and metacognitive skills):
 - Require students to summarize different types of thinking strategies.
 - Provide situations that require students to choose the best type of thinking strategy to use.
 - Require students to detect instances of open- v. closed-mindedness.
 - Require students to detect instances of responsible v. irresponsible and accurate v. inaccurate applications of thinking strategies.
 - Provide situations that require the student's persistence in order to discover or analyze information to obtain answers to specific questions.
 - Require students to apply specific thinking strategies to different real-world situations.
- **To assess *Verbal Information, Knowledge, or Facts*:**
 - Require students to recall information.
 - Require students to restate information.

REFERENCES FOR LEARNING FEATURES

*For a complete list of references and citations, please refer to **Destination: Florida Classrooms—Evaluator’s Handbook**, or request a list of references from the Department of Education, Bureau of Curriculum, Instruction, and Assessment.*

Criteria for Evaluation



The instructional materials adoption process must be fair to all publishers who take the time and expense to submit their materials. Applying evaluation criteria consistently to each submission assures that the materials will be judged fairly.

Regardless of format or technology, effective materials have certain characteristics in common, and the basic issues, important for the evaluation of instructional materials, apply to all subject areas and all formats. These issues are addressed in Florida's list of priorities and the criteria as detailed in the previous pages of this document. What follows is the evaluation instrument used by adoption committee members. Evaluators will use the criteria-based instrument to engage in systematic reflection of the processes they follow and decisions they make about the quality of materials submitted by publishers.

The extensive research base and review processes used to identify these criteria establish their validity as an integral part of Florida's instructional materials adoption system. Applying these criteria consistently to each submission helps assure that the materials submitted by publishers will be judged fairly.

STATE COMMITTEE EVALUATION FORM

DIRECTIONS: Use this form along with the criteria in the instructional materials specifications to independently review each submission.

As part of your independent review for each of the criteria, rate and comment on how well the submission satisfies the requirements. Possible ratings are as follows: ■ THOROUGHLY, ■ HIGHLY, ■ ADEQUATELY, ■ MINIMALLY, or ■ NOT AT ALL.

At your state committee meeting, you will discuss your review and agree on the summary of RATINGS, COMMENTS, and the OVERALL EVALUATION for each submission. Your committee will then VOTE for or against adoption and will make suggestions for notations to include in the Florida Catalog of Instructional Materials. Your committee's decisions will appear on one Committee Consensus Questionnaire.

IDENTIFICATION OF SUBMISSION
Subject Area Committee
Course for Which Recommended
Name of Publisher
Title of Submission

CONTENT

A. ALIGNMENT WITH CURRICULUM REQUIREMENTS

Content aligns with the state's standards for the subject, grade level, and learning outcomes.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? (Please give specific examples with page numbers. Extra space for notations is provided on page 8.)

- ✓ CORRELATIONS _____
- ✓ SCOPE _____
- ✓ COMPLETENESS _____

B. LEVEL OF TREATMENT OF CONTENT

The level of complexity or difficulty of content is appropriate for the standards, student abilities and grade level, and time periods allowed for teaching.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? (Please give specific examples with page numbers. Extra space for notations is provided on page 8.)

- ✓ OBJECTIVES _____
- ✓ STUDENTS _____
- ✓ TIME _____

C. EXPERTISE FOR CONTENT DEVELOPMENT

Expertise in the content area and in education of the intended students is reflected in the authors, reviewers, and sources that contributed to development of the materials.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

✓ AUTHORSHIP _____

✓ SOURCES _____

D. ACCURACY OF CONTENT

Content is accurate in historical context and contemporary facts and concepts.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

✓ OBJECTIVITY _____

✓ REPRESENTATIVENESS _____

✓ CORRECTNESS _____

E. CURRENTNESS OF CONTENT

Content is up-to-date for the academic discipline and the context in which the content is presented.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

✓ DATES OR EDITIONS _____

✓ CONTEXT _____

✓ INFORMATION _____

F. AUTHENTICITY OF CONTENT

Content includes problem-centered connections to life in a context that is meaningful to students.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

✓ LIFE CONNECTIONS _____

✓ INTERDISCIPLINARY TREATMENT _____

G. MULTICULTURAL REPRESENTATION

Portrayal of gender, ethnicity, age, work situations, and social groups includes multicultural fairness and advocacy.

- THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

- ✓ MULTICULTURAL FAIRNESS _____
✓ MULTICULTURAL ADVOCACY _____

H. HUMANITY AND COMPASSION

Portrayal of the appropriate care and treatment of people and animals includes compassion, sympathy, and consideration of their needs and values and excludes hard-core pornography and inhumane treatment.

- THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

- ✓ INCLUSION OF COMPASSION _____
✓ EXCLUSION OF INHUMANITY _____

SUMMARY ANALYSIS FOR CONTENT

In general, how well does the submission satisfy *CONTENT* requirements?

- THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

PRESENTATION

A. COMPREHENSIVENESS OF STUDENT AND TEACHER RESOURCES

Resources are complete enough to address the targeted learning outcomes without requiring the teacher to prepare additional teaching materials for the course.

- THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

- ✓ STUDENT RESOURCES _____
✓ TEACHER RESOURCES _____

B. ALIGNMENT OF INSTRUCTIONAL COMPONENTS

All components of an instructional package align with each other, as well as with the curriculum.

- THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issue? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

- ✓ ALIGNMENT _____

C. ORGANIZATION OF INSTRUCTIONAL MATERIALS

The structure and format of materials have enough order and clarity to allow students and teachers to access content and explicitly identify ideas and sequences.

- THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

- ✓ ACCESS TO CONTENT _____

- ✓ VISIBLE STRUCTURE AND FORMAT _____

- ✓ LOGICAL ORGANIZATION _____

D. READABILITY OF INSTRUCTIONAL MATERIALS

Narrative and visuals will engage students in reading or listening as well as understanding of the content.

- THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

- ✓ LANGUAGE STYLE _____

- ✓ VISUAL FEATURES _____

E. PACING OF CONTENT

The amount or content presented at one time or the pace at which it is presented is of a size or rate that allows students to perceive and understand it.

- THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issue? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

- ✓ PACING _____

F. EASE OF USE OF MATERIALS

Both print and other media formats of instructional materials are easy to use and replace and are durable enough for multiple uses over time.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

✓ WARRANTY _____
✓ USE _____
✓ DURABILITY _____

SUMMARY ANALYSIS FOR PRESENTATION

In general, how well does the submission satisfy *PRESENTATION* requirements?

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

LEARNING

A. MOTIVATIONAL STRATEGIES

Instructional materials include features to maintain learner motivation.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

✓ EXPECTATIONS _____
✓ FEEDBACK _____
✓ APPEARANCE _____

B. TEACHING A FEW “BIG IDEAS”

Instructional materials thoroughly teach a few important ideas, concepts, or themes.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

✓ FOCUS _____
✓ COMPLETENESS _____

C. EXPLICIT INSTRUCTION

Instructional materials contain clear statements of information and outcomes.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

✓ CLARITY OF DIRECTIONS AND EXPLANATIONS _____

✓ EXCLUSIONS OF AMBIGUITY _____

D. GUIDANCE AND SUPPORT

Instructional materials include guidance and support to help students safely and successfully become more independent learners and thinkers.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

✓ LEVEL _____

✓ ADAPTABILITY _____

E. ACTIVE PARTICIPATION OF STUDENTS

Instructional materials will engage the physical and mental activity of students during the learning process.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

✓ ASSIGNMENTS _____

✓ STUDENT RESPONSES _____

F. TARGETED INSTRUCTIONAL STRATEGIES

Instructional materials include the strategies known to be successful for teaching the learning outcomes targeted in the curriculum requirements.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

✓ ALIGNMENT _____

✓ COMPLETENESS _____

G. TARGETED ASSESSMENT STRATEGIES

Instructional materials include assessment strategies known to be successful in determining how well students have achieved learning outcomes targeted in the curriculum requirements.

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

What COMMENTS, if any, do you have about the strengths or concerns for the following issues? *(Please give specific examples with page numbers. Extra space for notations is provided on page 8.)*

✓ ALIGNMENT _____

✓ COMPLETENESS _____

SUMMARY ANALYSIS FOR LEARNING

In general, how well does the submission satisfy *LEARNING* requirements?

THOROUGHLY HIGHLY ADEQUATELY MINIMALLY NOT AT ALL

OVERALL EVALUATION

1. If given responsibility for teaching the course, would you choose these materials for classroom use?

YES NO

2. What notations do you think should be included in the Catalog?

Committee Member Signature

Date

APPENDIX A

Florida's Curriculum Requirements TECHNOLOGY EDUCATION GRADES 6 – 12



The following pages contain Student Performance Standards and Curriculum Frameworks. Publishers will be required to correlate to these in their submissions.

Program Title: **Integrated Technology Studies**

Occupational Area: Technology Education

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 the applications of technology and its effect upon our lives and the choosing of an occupation. The content and activities will also include the study of safety, and leadership skills. 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 emphasis of this program is on developing awareness of future needs, developing technological competence, confidence and awareness through interaction with technologies, developing awareness of other vocational programs, interacting with business, industry and community organizations, applying basic skills in learning activities, and developing self-awareness of individual abilities, needs and interests. The courses are intended to help students develop their problem-solving skills and creativity while learning about technology and careers. Students will learn to gather data through research and testing, as well as to document their results and processes.

The content includes introductory studies in areas of technology which introduce students to the development of abilities to calculate, make important observations, analyze and solve problems using manipulative skills while working cooperatively with others in team activities.

Listed below are the courses that make up this program:

- Introduction to Technology
- Exploring Technology
- Exploration of Communications Technology
- Exploration of Production Technology
- Exploration of Aerospace Technology
- Exploration of Power & Energy Technology
- Exploration of Transportation Technology

II. LABORATORY ACTIVITIES: Instruction and learning activities are provided in a laboratory setting using hands-on experiences with technology equipment, 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 academic and 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>>.

INTENDED OUTCOMES: After successfully completing a course the student will be able to:

TECHNOLOGICAL LITERACY STANDARDS

Demonstrate an understanding of the characteristics and scope of technology.

Demonstrate an understanding of the core concepts of technology.

Demonstrate an understanding of the relationships among technologies and the connection between technology and other fields of study.

Demonstrate an understanding of the cultural, social, economic, and political effects of technology.

Demonstrate an understanding of the effects of technology on the environment.

Demonstrate an understanding of the role of society in the development and use of technology.

Demonstrate an understanding of the influence of technology on history.

Demonstrate an understanding of the attributes of design.

Demonstrate an understanding of engineering design.

Demonstrate an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Demonstrate the abilities to apply the design process.

Demonstrate the abilities to use and maintain technological products and systems.

Demonstrate the abilities to assess the impact of products and systems.

Demonstrate an understanding of and be able to select and use medical technologies.

Demonstrate an understanding of and be able to select and use agricultural and related biotechnologies.

Demonstrate an understanding of and be able to select and use energy and power technologies.

Demonstrate an understanding of and be able to select and use information and communications technologies.

Demonstrate an understanding of and be able to select and use transportation technologies.

Demonstrate an understanding of and be able to select and use manufacturing technologies.

Demonstrate an understanding of and be able to select and use construction technologies.

TECHNICAL CONTENT STANDARDS

Demonstrate proper and safe procedures while working with technological tools, apparatus, equipment, systems, and materials.

Exhibit positive human relations and leadership skills.

Discuss individual interests, aptitudes, and opportunities as they relate to a career.

Demonstrate an application of basic electronic publishing techniques.

Identify, describe and utilize the major types of printing techniques used in print production.

Identify and demonstrate the role of electronic communication.

Identify and demonstrate the role of optical technology.

Identify evolving technologies of Production Systems.

Perform special skills unique to Manufacturing Technology.

Express knowledge of factors that impact Manufacturing Technologies and practices.

Perform special skills unique to Construction Technology.

Express knowledge of factors that impact Construction Technology and practices.

Demonstrate knowledge of the basic principles of aerostatics and aerodynamics.

Identify and demonstrate knowledge of both liquid and solid propellant rocket propulsion systems.

Define and describe the stages and forms of interference in basic satellite communication systems.

Perform special skills unique to power and energy technologies.

Express a knowledge of the industries that deal with power and energy technology.

Perform special skills unique to transportation technologies.

Express a knowledge of the industries that deal with transportation technology.

Course Title: Introduction to Technology

Course Credit: 0.5

COURSE DESCRIPTION: The purpose of this course is to give students an introduction to the areas of technology and to introduce students to the design and problem solving processes using manipulative skills while working cooperatively with others in team activities.

STUDENT PERFORMANCE STANDARDS:

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY.--The student will be able to:

Develop new products and systems to solve problems or to help do things that could not be done without the help of technology. STL.1.F

Describe the development of technology as a human activity that is the result of individual or collective needs and the ability to be creative. STL.1.G

Explain how technology is closely linked with creativity, which has resulted in innovation. STL.1.H

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY.--The student will be able to:

Identify technological systems including input, processes, output, and, at times, feedback. STL.2.M

Define systems thinking, involving considering how every part relates to others. STL.2.N

Define open-loop systems having no feedback path and requiring human intervention, and closed-loop system using feedback. STL.2.O

Identify how technological systems can be connected to one another. STL.2.P

Diagnose malfunctions of any part of a system that may affect the function and quality of the system. STL.2.Q

Identify requirements or parameters placed on the development of a product or system. STL.2.R

Identify trade-offs as a decision process recognizing the need for careful compromises among competing factors. STL.2.S

Identify different technologies that involve different sets of processes. STL.2.T

Define maintenance as the process of inspecting and servicing a product or system on a regular basis in order for it to continue functioning properly, to extend its life, or to upgrade its capability. STL.2.U

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTION BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY.--The student will be able to:

Explain how technological systems interact with one another. STL.3.D

Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and systems. STL.3.F

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY.--The student will be able to:

Identify the ways that use of technology affects humans, including their safety, comfort, choices, and attitudes about technology's development and use. STL.4.D

Explain that technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences. STL.4.E

Identify ethical issues associated with the development and use of technology.. STL.4.F

Identify the economic, political, and cultural issues that are influenced by the development and use of technology. STL.4.G

DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT.--The student will be able to:

Describe the management of waste produced by technological systems as an important societal issue. STL.5.D

Identify how technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems. STL.5.E

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY.--The student will be able to:

Identify the development of technologies that has resulted from the demands, values, and interests of individuals, businesses, industries, and societies. STL.6.D

Identify changes in society and the creation of new needs and wants caused by the use of inventions and innovations. STL.6.E

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY.--The student will be able to:

Identify inventions and innovations that have evolved by using slow and methodical processes of tests and refinements. STL.7.C

Explain how the specialization of function has been at the heart of many technological improvements. STL.7.D

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN.--

The student will be able to:

Use design as a creative planning process that leads to useful products and systems. STL.8.E

Explain why there is no perfect design. STL.8.F

Identify criteria and constraints that are requirements for a design. STL.8.G

DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN.--The

student will be able to:

Document the design process involving a set of steps, which can be performed in different sequences and repeated as needed. STL.9.F

Define brainstorming as a group problem-solving design process in which each person in the group presents his or her ideas in an open forum. STL.9.G

Model, test, evaluate and modify designs to transform ideas into practical solutions. STL.9.H

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING.--The

student will be able to:

Use troubleshooting as a problem-solving method used to identify the cause of a malfunction in a technological system. STL.10.F

Define invention as a process of turning ideas and imagination into devices and systems and innovation as the process of modifying an existing product or system to improve it. STL.10.G

Identify technological problems that are best solved through experimentation. STL.10.H

DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS.--The

student will be able to:

Apply a design process to solve problems in and beyond the laboratory-classroom. STL.11.H

Specify criteria and constraints for the design. STL.11.I

Make two-dimensional and three-dimensional representations of the designed solution. STL.11.J

Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed. STL.11.K

Make a product or system and document the solution. STL.11.L

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS.--The student will be able to:

Use information provided in manuals, protocols, or by experienced people to see and understand how things work. STL.12.H

Use tools, materials, and machines safely to diagnose, adjust, and repair systems. STL.12.I

Use computers and calculators in various applications. STL.12.J

Operate and maintain systems in order to achieve a given purpose. STL.12.K

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS.--The student will be able to:

Design and use instruments to gather data. STL.13.F

Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology. STL.13.G

Identify trends and monitor potential consequences of technological development. STL.13.H

Interpret and evaluate the accuracy of the information obtained and determine if it is useful. STL.13.I

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MEDICAL TECHNOLOGIES.--The student will be able to:

Identify sanitation processes used in the disposal of medical products help to protect people from harmful organisms and disease, and shape the ethics of medical safety. STL.14.H

Explain how the vaccines developed for use in immunization require specialized technologies to support environments in which a sufficient amount of vaccines are produced. STL.14.I

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE AGRICULTURAL AND RELATED BIOTECHNOLOGIES.--The student will be able to:

Identify technological advances in agriculture directly affecting the time and number of people required to produce food for a large population. STL.15.F

Identify a wide range of specialized equipment and practices is used to improve the production of food, fiber, fuel, and other useful products and in the care of animals. STL.15.G

Explain how biotechnology applies the principles of biology to create commercial products or processes. STL.15.H

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE ENERGY AND POWER TECHNOLOGIES.--The student will be able to:

Define energy as the capacity to do work. STL.16.E

Explain how energy can be used to do work, using many processes. STL.16.F

Define power as the rate at which energy is converted from one form to another or transferred from one place to another, or the rate at which work is done. STL.16.G

Define power systems used to drive and provide propulsion to other technological products and systems. STL.16.H

Explain how much of the energy used in our environment is not used efficiently. STL.16.I

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE INFORMATION AND COMMUNICATION TECHNOLOGIES.--The student will be able to:

Identify information and communication systems that allow information to be transferred from human to human, human to machine, machine to machine, and machine to human. STL.17.H

Define communication systems made up of a source, encoder, transmitter, receiver, decoder, and destination. STL.17.I

Identify factors that influence the design of a message, such as the intended audience, medium, purpose, and nature of the message. STL.17.J

Use symbols, measurements, and drawings to promote clear communication by providing a common language to express ideas. STL.17.K

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE TRANSPORTATION TECHNOLOGIES.--The student will be able to:

Describe how transporting people and goods involves a combination of individuals and vehicles. STL.18.F

Identify subsystems of transportation vehicles, such as structural, propulsion, suspension, guidance, control, and support, that must function together for a system to work effectively. STL.18.G

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES.--The student will be able to:

Define manufacturing systems using mechanical processes that change the form of materials through processes of separating, forming, combining, and conditioning them. STL.19.F

Classify manufactured goods as durable and non-durable. STL.19.G

Document the manufacturing process including the designing, development, making, and servicing of products and systems. STL.19.H
Define chemical technologies that are used to modify or alter chemical substances. STL.19.I

Explain that materials must first be located before they can be extracted from the earth through processes such as harvesting, drilling, and mining. STL.19.J

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE CONSTRUCTION TECHNOLOGIES.--The student will be able to:

Consider factors such as building laws and codes, style, convenience, cost, climate, and function in the selection of designs for structures. STL.20.F

Explain that structures rest on a foundation. STL.20.G

Classify structures as temporary or permanent. STL.20.H

Identify subsystems of a building. STL.20.I

DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS.--The student will be able to:

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at workstation within total laboratory.

Conduct laboratory activities and equipment operations in a safe manner.

Exercise care and respect for all tools, equipment, and materials.

Identify color-coding safety standards.

Safely use hand tools and power equipment.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS.--The student will be able to:

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Work cooperatively with others.

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

Describe individual strengths and weaknesses.

Discuss individual interests related to a career.

Identify careers within specific areas of technology.
Explore careers within specific areas of interest.

Course Title: Exploring Technology

Course Credit: 0.5

COURSE DESCRIPTION: The purpose of this course is to give students an opportunity to explore the areas of technology and associated careers available in technical fields. Students will be given the opportunity to solve technological problems while gaining an understanding of the effects of technology on our everyday lives.

STUDENT PERFORMANCE STANDARDS:

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY.--The student will be able to:

Develop new products and systems to solve problems or to help do things that could not be done without the help of technology. STL.1.F

Describe the development of technology as a human activity that is the result of individual or collective needs and the ability to be creative. STL.1.G

Explain how technology is closely linked with creativity, which has resulted in innovation. STL.1.H

Demonstrate how corporations can often create demand for a product by bringing it onto the market and advertising it. STL.1.I

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY.--The student will be able to:

Describe technological systems including input, processes, output, and, at times, feedback. STL.2.M

Apply systems thinking, involving considering how every part relates to others. STL.2.N

Classify open-loop systems having no feedback path and requiring human intervention, and closed-loop system using feedback. STL.2.O

Explain how technological systems can be connected to one another. STL.2.P

Repair malfunctions of any part of a system that may affect the function and quality of the system. STL.2.Q

Compare and contrast requirements or parameters placed on the development of a product or system. STL.2.R

Compare and contrast trade-offs as a decision process recognizing the need for careful compromises among competing factors. STL.2.S

Describe different technologies that involve different sets of processes. STL.2.T

Perform basic maintenance as the process of inspecting and servicing a product or system on a regular basis in order for it to continue functioning properly, to extend its life, or to upgrade its capability. STL.2.U

Utilize controls and mechanisms or particular steps that people perform using information about the system that causes systems to change. STL.2.V

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTION BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY. --The student will be able to:

Modify the way technological systems interact with one another. STL.3.D

Apply a product, system, or environment developed for one setting in another setting. STL.3.E

Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and systems. STL.3.F

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY.--The student will be able to:

Describe ethical issues associated with the development and use of technology.. STL.4.F

Describe the economic, political, and cultural issues that are influenced by the development and use of technology. STL.4.G

DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT.--The student will be able to:

Describe the management of waste produced by technological systems as an important societal issue. STL.5.D

Describe how technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems. STL.5.E

Make decisions about the development and use technologies that put environmental and economic concerns in direct competition with one another. STL.5.F

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY.--The student will be able to:

Describe the development of technologies that has resulted from the demands, values, and interests of individuals, businesses, industries, and societies. STL.6.D

Describe changes in society and the creation of new needs and wants caused by the use of inventions and innovations. STL.6.E

Describe social and cultural priorities and values that are reflected in technological devices. STL.6.F

Explain how meeting societal expectations is the driving force behind the acceptance and use of products and systems. STL.6.G

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY.--The student will be able to:

Describe inventions and innovations that have evolved by using slow and methodical processes of tests and refinements. STL.7.C

Explain how the specialization of function has been at the heart of many technological improvements. STL.7.D

Describe the design and construction of structures for service or convenience evolving from the development of techniques for measurement, controlling systems, and the understanding of spatial relationships. STL.7.E

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN.--

The student will be able to:

Use design as a creative planning process that leads to useful products and systems. STL.8.E

Explain why there is no perfect design. STL.8.F

Evaluate criteria and constraints that are requirements for a design. STL.8.G

DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN.--The student will be able to:

Utilize the design process involving a set of steps, which can be performed in different sequences and repeated as needed. STL.9.F

Employ brainstorming as a group problem-solving design process in which each person in the group presents his or her ideas in an open forum. STL.9.G

Model, test, evaluate and modify designs to transform ideas into practical solutions. STL 9.H

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING.--The student will be able to:

The student will be able to:

Use troubleshooting as a problem-solving method used to identify the cause of a malfunction in a technological system. STL.10.F

Describe invention as a process of turning ideas and imagination into devices and systems and innovation as the process of modifying an existing product or system to improve it. STL.10.G

Identify technological problems that are best solved through experimentation. STL.10.H

DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS.--The student will be able to:

Apply a design process to solve problems in and beyond the laboratory-classroom. STL.11.H

Specify criteria and constraints for the design. STL.11.I

Make two-dimensional and three-dimensional representations of the designed solution. STL.11.J

Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed. STL.11.K

Make a product or system and document the solution. STL.11.L

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS.--The student will be able to:

Use information provided in manuals, protocols, or by experienced people to see and understand how things work. STL.12.H

Use tools, materials, and machines safely to diagnose, adjust, and repair systems. STL.12.I

Use computers and calculators in various applications. STL.12.J

Operate and maintain systems in order to achieve a given purpose. STL.12.K

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS.--The student will be able to:

Design and use instruments to gather data. STL.13.F

Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology. STL.13.G

Identify trends and monitor potential consequences of technological development. STL.13.H

Interpret and evaluate the accuracy of the information obtained and determine if it is useful. STL.13.I

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MEDICAL TECHNOLOGIES.--The student will be able to:

Describe advances and innovations in medical technologies are used to improve healthcare. STL.14.G

Describe sanitation processes used in the disposal of medical products help to protect people from harmful organisms and disease, and shape the ethics of medical safety. STL.14.H

Explain how the vaccines developed for use in immunization require specialized technologies to support environments in which a sufficient amount of vaccines are produced. STL.14.I

Describe genetic engineering involving modifying the structure of DNA to produce novel genetic make-ups. STL.14.J

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE AGRICULTURAL AND RELATED BIOTECHNOLOGIES.--The student will

be able to:

Describe technological advances in agriculture directly affecting the time and number of people required to produce food for a large population. STL.15.F

Describe a wide range of specialized equipment and practices is used to improve the production of food, fiber, fuel, and other useful products and in the care of animals. STL.15.G

Explain how biotechnology applies the principles of biology to create commercial products or processes. STL.15.H

Create artificial ecosystems that are human-made complexes that replicate some aspects of natural environments. STL.15.I

Explain how the development of refrigeration, freezing, dehydration, preservation, and irradiation provide long-term storage of food and reduce the health risks caused by tainted food. STL.15.J

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE ENERGY AND POWER TECHNOLOGIES.--The student will be able to:

Define energy as the capacity to do work. STL.16.E

Explain how energy can be used to do work, using many processes. STL.16.F

Define power as the rate at which energy is converted from one form to another or transferred from one place to another, or the rate at which work is done. STL.16.G

Describe power systems used to drive and provide propulsion to other technological products and systems. STL.16.H

Explain how much of the energy used in our environment is not used efficiently. STL.16.I

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE INFORMATION AND COMMUNICATION TECHNOLOGIES.--The student

will be able to:

Create information and communication systems that allow information to be transferred from human to human, human to machine, machine to machine, and machine to human. STL.17.H

Describe communication systems made up of a source, encoder, transmitter, receiver, decoder, and destination. STL.17.I

Consider factors that influence the design of a message, such as the intended audience, medium, purpose, and nature of the message. STL.17.J

Use symbols, measurements, and drawings to promote clear communication by providing a common language to express ideas. STL.17.K

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE TRANSPORTATION TECHNOLOGIES.--The student will be able to:

Describe how transporting people and goods involves a combination of individuals and vehicles. STL.18.F

Describe subsystems of transportation vehicles, such as structural, propulsion, suspension, guidance, control, and support, that must function together for a system to work effectively. STL.18.G

Identify governmental regulations that influence the design and operation of transportation systems. STL.18.H

Identify processes, such as receiving, holding, storing, loading, moving, unloading, delivering, evaluating, marketing, managing, communicating, and using conventions that are necessary for the entire transportation system to operate efficiently. STL.18.I

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES.--The student will be able to:

Describe manufacturing systems using mechanical processes that change the form of materials through processes of separating, forming, combining, and conditioning them. STL.19.F

Classify manufactured goods as durable and non-durable. STL.19.G

Employ the manufacturing process including the designing, development, making, and servicing of products and systems. STL.19.H

Describe chemical technologies that are used to modify or alter chemical substances. STL.19.I

Explain that materials must first be located before they can be extracted from the earth through processes such as harvesting, drilling, and mining. STL.19.J

Employ marketing a product involving informing the public about it as well as assisting in selling and distributing it. STL.19.K

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE CONSTRUCTION TECHNOLOGIES.--The student will be able to:

Consider factors such as building laws and codes, style, convenience, cost, climate, and function in the selection of designs for structures. STL.20.F

Explain that structures rest on a foundation. STL.20.G

Classify structures as temporary or permanent. STL.20.H

Describe subsystems of a building. STL.20.I

DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS.--The student will be able to:

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at workstation within total laboratory.

Conduct laboratory activities and equipment operations in a safe manner.

Identify tools, machines, materials and equipment and describe their functions.

Select appropriate tools, machines, and equipment to accomplish a given task.

Demonstrate safe and correct use of tools, machines, and equipment.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Work cooperatively with others.

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

Identify individual strengths and weaknesses.

Discuss individual interests related to a career.

Identify careers within specific areas of technology.

Explore careers within specific areas of interest.

Form an understanding and appreciation for work after listening to or observing technology workers.

Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

Form an understanding and appreciation for the roles and work of co-workers.

Course Title: Exploration of Communications Technology
Course Credit: 0.5

COURSE DESCRIPTION: The purpose of this course is to give students an opportunity to explore the area of communications technology and its associated careers. Students will be given the opportunity to solve technological problems using a variety of tools, materials, processes and systems while gaining an understanding of the effects of communications technology on our everyday lives.

STUDENT PERFORMANCE STANDARDS:

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY.--The student will be able to:

Develop new products and systems to solve problems or to help do things that could not be done without the help of technology. STL.1.F

Describe the development of technology as a human activity that is the result of individual or collective needs and the ability to be creative. STL.1.G

Explain how technology is closely linked with creativity, which has resulted in innovation. STL.1.H

(Explain, Demonstrate) how corporations can often create demand for a product by bringing it onto the market and advertising it. STL.1.I

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY.--The student will be able to:

Identify technological systems including input, processes, output, and, at times, feedback. STL.2.M

Apply systems thinking, involving considering how every part relates to others. STL.2.N

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTION BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY. --The student will be able to:

Modify the way technological systems interact with one another. STL.3.D

Apply a product, system, or environment developed for one setting in another setting. STL.3.E

Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and systems. STL.3.F

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY.--The student will be able to:

Describe the ways that use of technology affects humans, including their safety, comfort, choices, and attitudes about technology's development and use. STL.4.D
Explain that technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences. STL.4.E

Describe ethical issues associated with the development and use of technology.. STL.4.F

Describe the economic, political, and cultural issues that are influenced by the development and use of technology. STL.4.G

DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT.--The student will be able to:

Describe the management of waste produced by technological systems as an important societal issue. STL.5.D

Identify how technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems. STL.5.E

Make decisions about the development and use technologies that put environmental and economic concerns in direct competition with one another. STL.5.F

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY.--The student will be able to:

Describe the development of technologies that has resulted from the demands, values, and interests of individuals, businesses, industries, and societies. STL.6.D

Describe changes in society and the creation of new needs and wants caused by the use of inventions and innovations. STL.6.E

Describe social and cultural priorities and values that are reflected in technological devices. STL.6.F

Explain how meeting societal expectations is the driving force behind the acceptance and use of products and systems. STL.6.G

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY.--The student will be able to:

Describe inventions and innovations that have evolved by using slow and methodical processes of tests and refinements. STL.7.C

Explain how the specialization of function has been at the heart of many technological improvements. STL.7.D

Explain that in the past, an invention or innovation was not usually developed with the knowledge of science. STL.7.F

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN.--

The student will be able to:

Use design as a creative planning process that leads to useful products and systems. STL.8.E

Explain why there is no perfect design. STL.8.F

Evaluate criteria and constraints that are requirements for a design. STL.8.G

DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN.--The

student will be able to:

Utilize the design process involving a set of steps, which can be performed in different sequences and repeated as needed. STL.9.F

Employ brainstorming as a group problem-solving design process in which each person in the group presents his or her ideas in an open forum. STL.9.G

Model, test, evaluate and modify designs to transform ideas into practical solutions. STL 9.H

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING.--The

student will be able to:

Use troubleshooting as a problem-solving method used to identify the cause of a malfunction in a technological system. STL.10.F

Describe invention as a process of turning ideas and imagination into devices and systems and innovation as the process of modifying an existing product or system to improve it. STL.10.G

Identify technological problems that are best solved through experimentation. STL.10.H

DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS.--The

student will be able to:

Apply a design process to solve problems in and beyond the laboratory-classroom. STL.11.H

Specify criteria and constraints for the design. STL.11.I

Make two-dimensional and three-dimensional representations of the designed solution. STL.11.J

Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed. STL.11.K

Make a product or system and document the solution. STL.11.L

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS.--The student will be able to:

Use information provided in manuals, protocols, or by experienced people to see and understand how things work. STL.12.H

Use tools, materials, and machines safely to diagnose, adjust, and repair systems. STL.12.I

Use computers and calculators in various applications. STL.12.J

Operate and maintain systems in order to achieve a given purpose. STL.12.K

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS.--The student will be able to:

Design and use instruments to gather data. STL.13.F

Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology. STL.13.G

Identify trends and monitor potential consequences of technological development. STL.13.H

Interpret and evaluate the accuracy of the information obtained and determine if it is useful. STL.13.I

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE INFORMATION AND COMMUNICATION TECHNOLOGIES.--The student will be able to:

Create information and communication systems that allow information to be transferred from human to human, human to machine, machine to machine, and machine to human. STL.17.H

Describe communication systems made up of a source, encoder, transmitter, receiver, decoder, and destination. STL.17.I

Consider factors that influence the design of a message, such as the intended audience, medium, purpose, and nature of the message. STL.17.J

Use symbols, measurements, and drawings to promote clear communication by providing a common language to express ideas. STL.17.K

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES.--The student will be able to:

Employ the manufacturing process including the designing, development, making, and servicing of products and systems. STL.19.H

Employ Marketing a product involving informing the public about it as well as assisting in selling and distributing it. STL.19.K

DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS.--The student will be able to:

- Follow laboratory safety rules and procedures.
- Demonstrate good housekeeping at workstation within total laboratory.
- Conduct laboratory activities and equipment operations in a safe manner.
- Identify tools, machines, materials and equipment and describe their functions.
- Select appropriate tools, machines, and equipment to accomplish a given task.
- Demonstrate safe and correct use of tools, machines, and equipment.
- Identify color-coding safety standards.
- Explain fire prevention and safety precautions and practices for extinguishing fires.
- Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS.--The student will be able to:

- Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).
- Work cooperatively with others.

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

- Identify individual strengths and weaknesses.
- Discuss individual interests related to a career.
- List occupations, job requirements, and job opportunities in communication technology.
- List academic and vocational programs at the secondary levels in communications technologies. LA.A.2.3.7; VA.E.1.3.2

DEMONSTRATE AN APPLICATION OF BASIC ELECTRONIC PUBLISHING TECHNIQUES.--The student will be able to:

- Utilize electronic publishing to combine input, editing, and output into a finished product. LA.B.2.3.4; LA.E.2.3.2; MA.B.4.3.1; VA.A.1.3.4
- Utilize the components of layouts including type, typography and illustration to electronically manipulate the elements of a published product. MA.C.3.3.1

Develop a web page using appropriate electronic software. LA.D.2.3.7; LA.E.2.3.2; VA.A.1.3.4

Create a document on an electronic publishing system by inputting existing digitized graphics or by digitizing original art or photographs on a digitizing scanner. LA.A.2.3.5; LA.B.1.3.2; LA.B.1.3.3; VA.B.1.3.3; VA.B.1.3.4; VA.D.1.3.3; MA.B.4.3.1

IDENTIFY, DESCRIBE AND UTILIZE THE MAJOR TYPES OF PRINTING

TECHNIQUES USED IN PRINT PRODUCTION.--The student will be able to:

Identify and explain standard printing processes including but not limited to: relief, gravure, screen process, and lithographic printing. LA.A.2.3.7; MA.E.1.3.1

Utilize common design principles to create camera ready art. LA.A.2.3.5

Produce a printed product using a current printing method. SC.C.2.3.4

Utilize appropriate finishing techniques on a printed project. LA.A.2.3.5; VA.A.1.3.4; VA.B.1.3.3; VA.B.1.3.4; VA.D.1.3.3

IDENTIFY AND DEMONSTRATE THE ROLE OF ELECTRONIC

COMMUNICATION.--The student will be able to:

Explain how to create code, transmit, and receive messages using electronic devices. MA.E.1.3.1; SC.B.1.3.6

List and explain the common communication categories. TH.E.1.3.1

Define and explain the use of telecommunications in everyday life. MA.E.3.3.2; MU.E.2.3.1

Utilize a telecommunications device to transmit and receive an electronic message. MA.B.4.3.2; SC.A.2.3.1; SC.C.1.3.2; MU.E.1.3.2

Produce an audio and/or visual product using electronic communication technology. LA.A.2.3.5; FL.A.2.3.1; FL.A.2.3.2; FL.A.2.3.3; FL.A.2.3.4; VA.A.1.3.4; VA.B.1.3.1; VA.B.1.3.4; VA.D.1.3.3; MU.1.3.3; TH.A.1.3.1; TH.A.2.3.1; TH.A.3.3.1; TH.A.3.3.2; TH.B.1.3.1; TH.D.1.3.3; TH.E.1.3.2; TH.E.1.3.4

IDENTIFY AND DEMONSTRATE THE ROLE OF OPTICAL TECHNOLOGY.--

The student will be able to:

Identify the purposes and property of light as used in communications technology. SC.B.1.3.3

Explain how light signals are transmitted and received via different optical devices to include but not limited to: fiber optics, satellite communication, bandwidth, laser, and photography. SC.A.1.3.1; SC.B.1.3.1; SC.H.2.3.1; MA.B.4.3.2; MA.D.2.3.1; MA.D.2.3.2

Generate a product using optical technology. LA.A.2.3.5; VA.A.1.3.4; MA.E.1.3.1

Course Title: Exploration of Production Technology

Course Credit: 0.5

COURSE DESCRIPTION: The purpose of this course is to give students an opportunity to explore the area of production technology and its associated careers. Students will be given the opportunity to solve technological problems using a variety of tools , materials, processes and systems while gaining an understanding of the effects of production technology on our everyday lives.

STUDENT PERFORMANCE STANDARDS:

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY.--The student will be able to:

Develop new products and systems to solve problems or to help do things that could not be done without the help of technology. STL.1.F

Describe the development of technology as a human activity that is the result of individual or collective needs and the ability to be creative. STL.1.G

Explain how technology is closely linked with creativity, which has resulted in innovation. STL.1.H

Demonstrate how corporations can often create demand for a product by bringing it onto the market and advertising it. STL.1.I

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY.--The student will be able to:

Describe technological systems including input, processes, output, and, at times, feedback. STL.2.M

Apply systems thinking, involving considering how every part relates to others. STL.2.N

Classify open-loop systems having no feedback path and requiring human intervention, and closed-loop system using feedback. STL.2.O

Explain how technological systems can be connected to one another. STL.2.P

Repair malfunctions of any part of a system that may affect the function and quality of the system. STL.2.Q

Compare and contrast requirements or parameters placed on the development of a product or system. STL.2.R

Compare and contrast trade-offs as a decision process recognizing the need for careful compromises among competing factors. STL.2.S

Perform basic maintenance as the process of inspecting and servicing a product or system on a regular basis in order for it to continue functioning properly, to extend its life, or to upgrade its capability. STL.2.U

Utilize controls and mechanisms or particular steps that people perform using information about the system that causes systems to change. STL.2.V

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTION BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY. --The student will be able to:

Modify the way technological systems interact with one another. STL.3.D

Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and systems. STL.3.F

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY. --The student will be able to:

Describe the ways that use of technology affects humans, including their safety, comfort, choices, and attitudes about technology's development and use. STL.4.D

Explain that technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences. STL.4.E

Identify, Describe ethical issues associated with the development and use of technology.. STL.4.F

Describe the economic, political, and cultural issues that are influenced by the development and use of technology. STL.4.G

DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT. --The student will be able to:

Describe the management of waste produced by technological systems as an important societal issue. STL.5.D

Describe how technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems. STL.5.E

Make decisions about the development and use technologies that put environmental and economic concerns in direct competition with one another. STL.5.F

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY. --The student will be able to:

Describe the development of technologies that has resulted from the demands, values, and interests of individuals, businesses, industries, and societies. STL.6.D

Describe changes in society and the creation of new needs and wants caused by the use of inventions and innovations. STL.6.E

Describe social and cultural priorities and values that are reflected in technological devices. STL.6.F

Explain how meeting societal expectations is the driving force behind the acceptance and use of products and systems. STL.6.G

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY.--The student will be able to:

Describe inventions and innovations that have evolved by using slow and methodical processes of tests and refinements. STL.7.C

Explain how the specialization of function has been at the heart of many technological improvements. STL.7.D

Explain that in the past, an invention or innovation was not usually developed with the knowledge of science. STL.7.F

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN.--

The student will be able to:

Use design as a creative planning process that leads to useful products and systems. STL.8.E

Explain why there is no perfect design. STL.8.F

Evaluate criteria and constraints that are requirements for a design. STL.8.G

DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN.--The student will be able to:

Utilize the design process involving a set of steps, which can be performed in different sequences and repeated as needed. STL.9.F

Employ brainstorming as a group problem-solving design process in which each person in the group presents his or her ideas in an open forum. STL.9.G

Model, test, evaluate and modify designs to transform ideas into practical solutions. STL 9.H

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING.--The student will be able to:

Use troubleshooting as a problem-solving method used to identify the cause of a malfunction in a technological system. STL.10.F

Describe invention as a process of turning ideas and imagination into devices and systems and innovation as the process of modifying an existing product or system to improve it. STL.10.G

Identify technological problems that are best solved through experimentation. STL.10.H

DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS.--The student will be able to:

Apply a design process to solve problems in and beyond the laboratory-classroom. STL.11.H

Specify criteria and constraints for the design. STL.11.I

Make two-dimensional and three-dimensional representations of the designed solution. STL.11.J

Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed. STL.11.K

Make a product or system and document the solution. STL.11.L

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS.--The student will be able to:

Use information provided in manuals, protocols, or by experienced people to see and understand how things work. STL.12.H

Use tools, materials, and machines safely to diagnose, adjust, and repair systems. STL.12.I

Use computers and calculators in various applications. STL.12.J

Operate and maintain systems in order to achieve a given purpose. STL.12.K

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS.--The student will be able to:

Design and use instruments to gather data. STL.13.F

Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology. STL.13.G

Identify trends and monitor potential consequences of technological development. STL.13.H

Interpret and evaluate the accuracy of the information obtained and determine if it is useful. STL.13.I

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE INFORMATION AND COMMUNICATION TECHNOLOGIES.--The student will be able to:

Create information and communication systems that allow information to be transferred from human to human, human to machine, machine to machine, and machine to human. STL.17.H

Consider factors that influence the design of a message, such as the intended audience, medium, purpose, and nature of the message. STL.17.J
Use symbols, measurements, and drawings to promote clear communication by providing a common language to express ideas. STL.17.K

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES.--The student will be able to:

Describe manufacturing systems using mechanical processes that change the form of materials through processes of separating, forming, combining, and conditioning them. STL.19.F

Classify manufactured goods as durable and non-durable. STL.19.G

Employ the manufacturing process including the designing, development, making, and servicing of products and systems. STL.19.H

Describe chemical technologies that are used to modify or alter chemical substances. STL.19.I

Explain that materials must first be located before they can be extracted from the earth through processes such as harvesting, drilling, and mining. STL.19.J

Employ marketing a product involving informing the public about it as well as assisting in selling and distributing it. STL.19.K

DEMONSTRATE AND UNDERSTANDING OF AND BE ABLE TO SELECT AND USE CONSTRUCTION TECHNOLOGIES.--The student will be able to:

Consider factors such as building laws and codes, style, convenience, cost, climate, and function in the selection of designs for structures. STL.20.F

Explain that structures rest on a foundation. STL.20.G

Classify structures as temporary or permanent. STL.20.H

Identify subsystems of a building. STL.20.I

DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS.--The student will be able to:

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at workstation within total laboratory.

Conduct laboratory activities and equipment operations in a safe manner.

Identify tools, machines, materials and equipment and describe their functions.

Select appropriate tools, machines, and equipment to accomplish a given task.

Demonstrate safe and correct use of tools, machines, and equipment.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS.--The student will be able to:

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Work cooperatively with others.

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

Identify individual strengths and weaknesses.

Discuss individual interests related to a career.

List occupations, job requirements, and job opportunities in production technology.

List occupational training programs and academic programs at the secondary/postsecondary levels in production technology.

IDENTIFY EVOLVING TECHNOLOGIES OF PRODUCTION SYSTEMS.--The student will be able to:

List evolving technologies of manufacturing and construction industries.

Discuss the evolution of technologies related to manufacturing systems and construction processes.

Brainstorm futuristic production systems.

PERFORM SPECIAL SKILLS UNIQUE TO MANUFACTURING TECHNOLOGY-

-The student will be able to:

Design a product for custom or mass production manufacturing.

Plan a mass production system for manufacturing a product.

Perform materials forming practices such as casting or molding, and compressing or stretching.

Perform materials separating practices such as shearing, chip removing, and other separating processes.

Perform materials conditioning practices such as heat treating, physical conditioning, or through chemical reactions.

Combine components through mixing, coating, bonding, and mechanical fastening.

Assemble a product or a subassembly of a product.

EXPRESS KNOWLEDGE OF FACTORS THAT IMPACT MANUFACTURING TECHNOLOGY AND PRACTICES--The student will be able to:

- Explain economic factors that impact on manufacturing technology.
- Research and identify consumer demands for a manufactured product.
- Identify sources of raw materials and/or standard stock materials needed for a manufactured product.
- Interview, hire, train, or promote an applicant or employee for a simulated mass production manufacturing activity.
- Define the terms "organized labor" and "collective bargaining."
- Prepare a plan for marketing and distributing a manufactured product.

PERFORM SPECIAL SKILLS UNIQUE TO CONSTRUCTION TECHNOLOGY--

- The student will be able to:
- Interpret construction plans and blueprints.
 - Identify construction materials.
 - Apply carpentry skills.
 - Apply plumbing skills.
 - Apply electrical wiring skills.
 - Apply masonry skills.
 - Describe or demonstrate basic construction skills.

EXPRESS KNOWLEDGE OF FACTORS THAT IMPACT CONSTRUCTION TECHNOLOGY AND PRACTICES--The student will be able to:

- Explain economic factors that impact on construction technology.
- Research and identify types and styles of construction desired by consumers.
- List sources of raw materials and standard stock materials available to construction technology.
- Express knowledge of construction technology labor organizations and hiring practices.

Course Title: Exploration of Aerospace Technology
Course Credit: 0.5

COURSE DESCRIPTION: The purpose of this course is to give students an opportunity to explore the area of aerospace technology and its associated careers. Students will be given the opportunity to solve technological problems using a variety of tools , materials, processes and systems while gaining an understanding of the effects of aerospace technology on our everyday lives.

STUDENT PERFORMANCE STANDARDS:

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY.--The student will be able to:

Develop new products and systems to solve problems or to help do things that could not be done without the help of technology. STL.1.F

Explain how technology is closely linked with creativity, which has resulted in innovation. STL.1.H

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY.--The student will be able to:

Describe technological systems including input, processes, output, and, at times, feedback. STL.2.M

Explain how technological systems can be connected to one another. STL.2.P

Compare and contrast requirements or parameters placed on the development of a product or system. STL.2.R

Describe different technologies that involve different sets of processes. STL.2.T

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTION BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY.--The student will be able to:

Modify the way technological systems interact with one another. STL.3.D

Apply a product, system, or environment developed for one setting in another setting. STL.3.E

Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and systems. STL.3.F

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY.--The student will be able to:

Describe the ways that use of technology affects humans, including their safety, comfort, choices, and attitudes about technology's development and use. STL.4.D
Explain that technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences. STL.4.E

Describe the economic, political, and cultural issues that are influenced by the development and use of technology. STL.4.G

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY.--The student will be able to:

Describe the development of technologies that has resulted from the demands, values, and interests of individuals, businesses, industries, and societies. STL.6.D
Describe changes in society and the creation of new needs and wants caused by the use of inventions and innovations. STL.6.E

Explain how meeting societal expectations is the driving force behind the acceptance and use of products and systems. STL.6.G

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY.--The student will be able to:

Describe inventions and innovations that have evolved by using slow and methodical processes of tests and refinements. STL.7.C

Describe the design and construction of structures for service or convenience evolving from the development of techniques for measurement, controlling systems, and the understanding of spatial relationships. STL.7.E

Explain that in the past, an invention or innovation was not usually developed with the knowledge of science. STL.7.F

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN.--

The student will be able to:

Use design as a creative planning process that leads to useful products and systems. STL.8.E

Explain why there is no perfect design. STL.8.F

Evaluate criteria and constraints that are requirements for a design. STL.8.G

DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN.--The student will be able to:

Utilize the design process involving a set of steps, which can be performed in different sequences and repeated as needed. STL.9.F

Employ brainstorming as a group problem-solving design process in which each person in the group presents his or her ideas in an open forum. STL.9.G

Model, test, evaluate and modify designs to transform ideas into practical solutions. STL 9.H

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING.--The

student will be able to:

Use troubleshooting as a problem-solving method used to identify the cause of a malfunction in a technological system. STL.10.F

Describe invention as a process of turning ideas and imagination into devices and systems and innovation as the process of modifying an existing product or system to improve it. STL.10.G

Identify technological problems that are best solved through experimentation. STL.10.H

DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS.--The student will be able to:

Apply a design process to solve problems in and beyond the laboratory-classroom. STL.11.H

Specify criteria and constraints for the design. STL.11.I

Make two-dimensional and three-dimensional representations of the designed solution. STL.11.J

Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed. STL.11.K

Make a product or system and document the solution. STL.11.L

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS.--The student will be able to:

Use information provided in manuals, protocols, or by experienced people to see and understand how things work. STL.12.H

Use tools, materials, and machines safely to diagnose, adjust, and repair systems. STL.12.I

Use computers and calculators in various applications. STL.12.J

Operate and maintain systems in order to achieve a given purpose. STL.12.K

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS.--The student will be able to:

Design and use instruments to gather data. STL.13.F

Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology. STL.13.G

Identify trends and monitor potential consequences of technological development. STL.13.H

Interpret and evaluate the accuracy of the information obtained and determine if it is useful. STL.13.I

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE ENERGY AND POWER TECHNOLOGIES.--The student will be able to:

Define power as the rate at which energy is converted from one form to another or transferred from one place to another, or the rate at which work is done. STL.16.G

Describe power systems used to drive and provide propulsion to other technological products and systems. STL.16.H

Explain how much of the energy used in our environment is not used efficiently. STL.16.I

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE INFORMATION AND COMMUNICATION TECHNOLOGIES.--The student will be able to:

Create information and communication systems that allow information to be transferred from human to human, human to machine, machine to machine, and machine to human. STL.17.H

Describe communication systems made up of a source, encoder, transmitter, receiver, decoder, and destination. STL.17.I

Consider factors that influence the design of a message, such as the intended audience, medium, purpose, and nature of the message. STL.17.J

Use symbols, measurements, and drawings to promote clear communication by providing a common language to express ideas. STL.17.K

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE TRANSPORTATION TECHNOLOGIES.--The student will be able to:

Describe subsystems of transportation vehicles, such as structural, propulsion, suspension, guidance, control, and support, that must function together for a system to work effectively. STL.18.G

Employ processes, such as receiving, holding, storing, loading, moving, unloading, delivering, evaluating, marketing, managing, communicating, and using conventions that are necessary for the entire transportation system to operate efficiently. STL.18.I

DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS.--The student will be able to:

Follow laboratory safety rules and procedures.
Demonstrate good housekeeping at workstation within total laboratory.
Conduct laboratory activities and equipment operations in a safe manner.
Identify tools, machines, materials and equipment and describe their functions.
Select appropriate tools, machines, and equipment to accomplish a given task.
Demonstrate safe and correct use of tools, machines, and equipment.
Identify color-coding safety standards.
Explain fire prevention and safety precautions and practices for extinguishing fires.
Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS.--The student will be able to:

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).
Work cooperatively with others.

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

Identify individual strengths and weaknesses.
Discuss individual interests related to a career.
Identify careers within specific areas of technology.
Explore careers within specific areas of interest.
Form an understanding and appreciation for work after listening to or observing technology workers.
Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
Form an understanding and appreciation for the roles and work of co-workers.
List occupations, job requirements, and job opportunities in communication technology.
List occupational training programs and academic programs at the secondary/postsecondary levels in communication technology.

DEMONSTRATE KNOWLEDGE OF THE BASIC PRINCIPLES OF AEROSTATICS AND AERODYNAMICS.--The student will be able to:

Define terminology associated with aerostatics and aerodynamics.
Explain how buoyancy principles affect an object in a fluid.
Explain how Bernoulli's Principle applies to an object in flight.
Identify and describe basic forces acting on an object in flight.

Build an aerostatic vehicle.
Build an aerodynamic vehicle.

IDENTIFY AND DEMONSTRATE KNOWLEDGE OF BOTH LIQUID AND SOLID PROPELLANT ROCKET PROPULSION SYSTEMS.--The student will be able to:

Define technical terminology associated with propulsion systems.
Identify parts of a solid-propellant rocket engine.
Identify parts of a liquid-propellant rocket engine.
Discuss the principle of rocket propulsion.
Compare the propulsion systems of solid and liquid-propellant rockets.
Describe the steps in a multi-stage rocket launch.
Construct a solid-propellant model rocket.

DEFINE AND DESCRIBE THE STAGES AND FORMS OF INTERFERENCE IN BASIC SATELLITE COMMUNICATIONS SYSTEMS.--The student will be able to:

State definitions of the terms communication and interference.
List and define the stages of a basic communication system.
Describe forms of interference that can occur at various stages in a basic communication system.
Discuss the importance of feed back in a basic communication system.
Define parts of the process in a basic communication system.
Describe the parts of the process in a satellite communication system.
Describe the parts of the process in a helium-neon laser communication system.

Course Title: Exploration of Power & Energy Technology
Course Credit: 0.5 credits

COURSE DESCRIPTION: The purpose of this course is to give students an opportunity to explore the area of power and energy technology and its associated careers. Students will be given the opportunity to solve technological problems using a variety of tools, materials, processes and systems while gaining an understanding of the effects of power and energy technology on our everyday lives.

STUDENT PERFORMANCE STANDARDS:

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY.--The student will be able to:

Develop new products and systems to solve problems or to help do things that could not be done without the help of technology. STL.1.F

Describe the development of technology as a human activity that is the result of individual or collective needs and the ability to be creative. STL.1.G

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY.--The student will be able to:

Explain how technological systems can be connected to one another. STL.2.P

Compare and contrast trade-offs as a decision process recognizing the need for careful compromises among competing factors. STL.2.S

Perform basic maintenance as the process of inspecting and servicing a product or system on a regular basis in order for it to continue functioning properly, to extend its life, or to upgrade its capability. STL.2.U

Utilize controls and mechanisms or particular steps that people perform using information about the system that causes systems to change. STL.2.V

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTION BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY.--The student will be able to:

Modify the way technological systems interact with one another. STL.3.D

Apply a product, system, or environment developed for one setting in another setting. STL.3.E

Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and systems. STL.3.F

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY.--The student will be able to:

Describe the ways that use of technology affects humans, including their safety, comfort, choices, and attitudes about technology's development and use. STL.4.D
Explain that technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences. STL.4.E

Describe the economic, political, and cultural issues that are influenced by the development and use of technology. STL.4.G

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY.--The student will be able to:

Describe the development of technologies that has resulted from the demands, values, and interests of individuals, businesses, industries, and societies. STL.6.D
Describe changes in society and the creation of new needs and wants caused by the use of inventions and innovations. STL.6.E

Explain how meeting societal expectations is the driving force behind the acceptance and use of products and systems. STL.6.G

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY.--The student will be able to:

Describe inventions and innovations that have evolved by using slow and methodical processes of tests and refinements. STL.7.C

Explain how the specialization of function has been at the heart of many technological improvements. STL.7.D

Explain that in the past, an invention or innovation was not usually developed with the knowledge of science. STL.7.F

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN.--

The student will be able to:

Use design as a creative planning process that leads to useful products and systems. STL.8.E

Explain why there is no perfect design. STL.8.F

Evaluate criteria and constraints that are requirements for a design. STL.8.G

DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN.--The student will be able to:

Utilize the design process involving a set of steps, which can be performed in different sequences and repeated as needed. STL.9.F

Employ brainstorming as a group problem-solving design process in which each person in the group presents his or her ideas in an open forum. STL.9.G
Model, test, evaluate and modify designs to transform ideas into practical solutions. STL 9.H

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING.--The

student will be able to:

Use troubleshooting as a problem-solving method used to identify the cause of a malfunction in a technological system. STL.10.F

Describe invention as a process of turning ideas and imagination into devices and systems and innovation as the process of modifying an existing product or system to improve it. STL.10.G

Identify technological problems that are best solved through experimentation. STL.10.H

DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS.--The

student will be able to:

Apply a design process to solve problems in and beyond the laboratory-classroom. STL.11.H

Specify criteria and constraints for the design. STL.11.I

Make two-dimensional and three-dimensional representations of the designed solution. STL.11.J

Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed. STL.11.K

Make a product or system and document the solution. STL.11.L

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS.--The student will be able to:

Use information provided in manuals, protocols, or by experienced people to see and understand how things work. STL.12.H

Use tools, materials, and machines safely to diagnose, adjust, and repair systems. STL.12.I

Use computers and calculators in various applications. STL.12.J

Operate and maintain systems in order to achieve a given purpose. STL.12.K

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS.--The student will be able to:

Design and use instruments to gather data. STL.13.F

Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology. STL.13.G

Identify trends and monitor potential consequences of technological development. STL.13.H

Interpret and evaluate the accuracy of the information obtained and determine if it is useful. STL.13.I

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE ENERGY AND POWER TECHNOLOGIES.--The student will be able to:

Define energy as the capacity to do work. STL.16.E

Explain how energy can be used to do work, using many processes. STL.16.F

Define power as the rate at which energy is converted from one form to another or transferred from one place to another, or the rate at which work is done. STL.16.G

Describe power systems used to drive and provide propulsion to other technological products and systems. STL.16.H

Explain how much of the energy used in our environment is not used efficiently. STL.16.I

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE INFORMATION AND COMMUNICATION TECHNOLOGIES.--The student will be able to:

Create information and communication systems that allow information to be transferred from human to human, human to machine, machine to machine, and machine to human. STL.17.H

Use symbols, measurements, and drawings to promote clear communication by providing a common language to express ideas. STL.17.K

DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS.--The student will be able to:

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at workstation within total laboratory.

Conduct laboratory activities and equipment operations in a safe manner.

Identify tools, machines, materials and equipment and describe their functions.

Select appropriate tools, machines, and equipment to accomplish a given task.

Demonstrate safe and correct use of tools, machines, and equipment.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS.--The student will be able to:

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Work cooperatively with others.

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

Identify individual strengths and weaknesses.

Discuss individual interests related to a career.

Identify careers within specific areas of technology.

Explore careers within specific areas of interest.

Form an understanding and appreciation for work after listening to or observing technology workers.

Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

Form an understanding and appreciation for the roles and work of co-workers.

List occupations, job requirements, and employment opportunities in power energy technology.

List occupational training programs and academic programs available at the secondary and post-secondary levels in power and in transportation technologies.

PERFORM SPECIAL SKILLS UNIQUE TO POWER AND ENERGY TECHNOLOGIES.--The student will be able to:

Disassemble and reassemble or perform maintenance on a human-powered device.

Disassemble and reassemble or perform maintenance on a pneumatic or hydraulic device.

Disassemble and reassemble or perform maintenance on an internal combustion engine.

Disassemble and reassemble or perform maintenance on an electrical motor, generator, or alternator.

Construct a water-powered, wind-powered, steam-powered, thermal-powered, or solar-powered device.

EXPRESS A KNOWLEDGE OF THE INDUSTRIES THAT DEAL WITH POWER AND ENERGY TECHNOLOGY.--The student will be able to:

Identify the technologies that supply or control energy sources.

Identify technologies that produce power systems.

Describe power and energy applications in everyday life.

List energy systems produced or used by industries.

Course Title: Exploration of Transportation Technology
Course Credit: 0.5 credits

COURSE DESCRIPTION: The purpose of this course is to give students an opportunity to explore the area of transportation technology and its associated careers. Students will be given the opportunity to solve technological problems using a variety of tools, materials, processes and systems while gaining an understanding of the effects of transportation technology on our everyday lives.

STUDENT PERFORMANCE STANDARDS:

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY.--The student will be able to:

Develop new products and systems to solve problems or to help do things that could not be done without the help of technology. STL.1.F

Describe the development of technology as a human activity that is the result of individual or collective needs and the ability to be creative. STL.1.G

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY.--The student will be able to:

Apply systems thinking, involving considering how every part relates to others. STL.2.N

Classify open-loop systems having no feedback path and requiring human intervention, and closed-loop system using feedback. STL.2.O

Explain how technological systems can be connected to one another. STL.2.P

Compare and contrast requirements or parameters placed on the development of a product or system. STL.2.R

Compare and contrast trade-offs as a decision process recognizing the need for careful compromises among competing factors. STL.2.S

Perform basic maintenance as the process of inspecting and servicing a product or system on a regular basis in order for it to continue functioning properly, to extend its life, or to upgrade its capability. STL.2.U

Identify controls and mechanisms or particular steps that people perform using information about the system that causes systems to change. STL.2.V

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTION BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY. --The student will be able to:

Modify the way technological systems interact with one another. STL.3.D

Apply a product, system, or environment developed for one setting in another setting. STL.3.E

Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and systems. STL.3.F

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY.--The student will be able to:

Describe the ways that use of technology affects humans, including their safety, comfort, choices, and attitudes about technology's development and use. STL.4.D

Explain that technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences. STL.4.E

Describe the economic, political, and cultural issues that are influenced by the development and use of technology. STL.4.G

DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT.--The student will be able to:

Describe the management of waste produced by technological systems as an important societal issue. STL.5.D

Describe how technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems. STL.5.E

Make decisions about the development and use technologies that put environmental and economic concerns in direct competition with one another. STL.5.F

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY.--The student will be able to:

Describe the development of technologies that has resulted from the demands, values, and interests of individuals, businesses, industries, and societies. STL.6.D

Describe changes in society and the creation of new needs and wants caused by the use of inventions and innovations. STL.6.E

Explain how meeting societal expectations is the driving force behind the acceptance and use of products and systems. STL.6.G

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY.--The student will be able to:

Describe inventions and innovations that have evolved by using slow and methodical processes of tests and refinements. STL.7.C

Describe the design and construction of structures for service or convenience evolving from the development of techniques for measurement, controlling systems, and the understanding of spatial relationships. STL.7.E
Explain that in the past, an invention or innovation was not usually developed with the knowledge of science. STL.7.F

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN.--

The student will be able to:

Use design as a creative planning process that leads to useful products and systems. STL.8.E

Explain why there is no perfect design. STL.8.F

Evaluate criteria and constraints that are requirements for a design. STL.8.G

DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN.--The

student will be able to:

Utilize the design process involving a set of steps, which can be performed in different sequences and repeated as needed. STL.9.F

Employ brainstorming as a group problem-solving design process in which each person in the group presents his or her ideas in an open forum. STL.9.G

Model, test, evaluate and modify designs to transform ideas into practical solutions. STL.9.H

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING.--The

student will be able to:

Use troubleshooting as a problem-solving method used to identify the cause of a malfunction in a technological system. STL.10.F

Describe invention as a process of turning ideas and imagination into devices and systems and innovation as the process of modifying an existing product or system to improve it. STL.10.G

Identify technological problems that are best solved through experimentation. STL.10.H

DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS.--The

student will be able to:

Apply a design process to solve problems in and beyond the laboratory-classroom. STL.11.H

Specify criteria and constraints for the design. STL.11.I

Make two-dimensional and three-dimensional representations of the designed solution. STL.11.J

Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed. STL.11.K

Make a product or system and document the solution. STL.11.L

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS.--The student will be able to:

Use information provided in manuals, protocols, or by experienced people to see and understand how things work. STL.12.H

Use tools, materials, and machines safely to diagnose, adjust, and repair systems. STL.12.I

Use computers and calculators in various applications. STL.12.J

Operate and maintain systems in order to achieve a given purpose. STL.12.K

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS.--The student will be able to:

Design and use instruments to gather data. STL.13.F

Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology. STL.13.G

Identify trends and monitor potential consequences of technological development. STL.13.H

Interpret and evaluate the accuracy of the information obtained and determine if it is useful. STL.13.I

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE ENERGY AND POWER TECHNOLOGIES.--The student will be able to:

Describe power systems used to drive and provide propulsion to other technological products and systems. STL.16.H

Explain how much of the energy used in our environment is not used efficiently. STL.16.I

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE TRANSPORTATION TECHNOLOGIES.--The student will be able to:

Describe how transporting people and goods involves a combination of individuals and vehicles. STL.18.F

Describe subsystems of transportation vehicles, such as structural, propulsion, suspension, guidance, control, and support, that must function together for a system to work effectively. STL.18.G

Identify governmental regulations that influence the design and operation of transportation systems. STL.18.H

Employ processes, such as receiving, holding, storing, loading, moving, unloading, delivering, evaluating, marketing, managing, communicating, and using conventions that are necessary for the entire transportation system to operate efficiently. STL.18.I

DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS.--The student will be able to:

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at workstation within total laboratory.

Conduct laboratory activities and equipment operations in a safe manner.

Identify tools, machines, materials and equipment and describe their functions.

Select appropriate tools, machines, and equipment to accomplish a given task.

Demonstrate safe and correct use of tools, machines, and equipment.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS.--The student will be able to:

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Work cooperatively with others.

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

Identify individual strengths and weaknesses.

Discuss individual interests related to a career.

Identify careers within specific areas of technology.

Explore careers within specific areas of interest.

Form an understanding and appreciation for work after listening to or observing technology workers.

Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

Form an understanding and appreciation for the roles and work of co-workers.

List occupations, job requirements, and job opportunities in production technology.

List occupational training programs and academic programs at the secondary/postsecondary levels in production technology.

PERFORM SPECIAL SKILLS UNIQUE TO TRANSPORTATION

TECHNOLOGIES--The student will be able to:

Disassemble and reassemble or perform maintenance on a muscle-powered bicycle.

Disassemble and reassemble or perform maintenance on a pneumatic or hydraulic device.

Disassemble and reassemble or perform maintenance on an internal combustion engine.

Disassemble and reassemble or perform maintenance on an electrical motor, generator, or alternator.

Construct, maintain, or repair a land, water, or air/space vehicle.

EXPRESS A KNOWLEDGE OF THE INDUSTRIES THAT DEAL WITH

TRANSPORTATION TECHNOLOGY--The student will be able to:

Describe power and energy applications in transportation technology.

Identify transportation products that have been developed by industries.

List and describe transportation systems produced or used by industries.

Program Title: Technology Systems
Occupational Area: Technology Education

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 the applications of technology and its effect upon our lives and the choosing of an occupation. Students will be introduced to the concepts that underlie technological systems and the influence of technological systems at home, school, and the world of work. 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.

Listed below are the courses that make up this program at the secondary level:

- Communication Systems
- Power and Transportation Systems
- Production Systems
- Drafting/Illustrative Design Systems
- Electronics Systems
- Engineering Systems
- Applied Technology Systems
- Home Technology Systems

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

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>>.

IV. INTENDED OUTCOMES: After successfully completing a course the student will be able to:

Demonstrate the ability to work safely with a variety of Technologies.

Demonstrate interpersonal skills as they relate to the workplace.

Identify and apply methods of information acquisition and utilization's.

Apply basic skills in communications mathematics, and science appropriate to technological content and learning activities.

Demonstrate and apply design/problem-solving processes.

Express an understanding of technology systems and their complex interrelationships.

Demonstrate the ability to properly identify, organize, plan and allocate resources.

Demonstrate technological literacy about communications systems.

Apply communications technology skills.

Describe sources of energy.

Describe the application of energy to power and transportation systems.

Apply technology skills to a selected power or transportation system.

Demonstrate knowledge of the production systems found in modern industries.

Define the processes related to materials utilized in manufacturing and production.

Plan and develop a system to produce a product from available materials.

Demonstrate proper and safe procedures and technical knowledge and skills in the use and care of drafting instruments, materials equipment.

Demonstrate technical knowledge skills and applications common to all types of drafting including CAD.

Demonstrate technical knowledge and skills for making drafting sketches.

Demonstrate technical knowledge and skills for making three-view orthographic drawings.

Demonstrate technical knowledge and skills for making oblique pictorial drawings.

Demonstrate technical knowledge and skills for making isometric pictorial drawings.

Demonstrate technical knowledge and skills for making aerodynamic drawings.

Demonstrate technical knowledge and skills for making a CAD drawing.

Demonstrate technical knowledge and skills for reproducing a CAD drawing on a plotter.

Apply electricity/electronics technology skills.

Demonstrate technological literacy about electricity/electronics systems.

Demonstrate knowledge of the role electronics plays in magnetic, optical, fluid and mechanical control systems.

Demonstrate the engineering analysis and design methods.

Communicate through oral, written or graphic means the results of solutions or designs.

Demonstrate and apply mechanical, fluid, electrical and thermal system principles.

Demonstrate knowledge of materials and processes.

Use tools, machines, calculators, and computers necessary for obtaining solutions to design problems.

Describe the functional characteristics of the engineering design team.

Discuss the impact of technology on society and the environment.

Demonstrate and apply mechanical system principles.

Demonstrate and apply fluid system principles.

Demonstrate and apply electrical system principles.

Demonstrate and apply thermal system principles.

Demonstrate the use of a computer to integrate and control a system composed of mechanical, fluid and electrical systems.

Demonstrate the use of sensors to control systems.

Demonstrate the use of fiber optics concepts.

Demonstrate the use of laser optic concepts.

Identify and list the different systems found in the new homes under construction today.

Draw up a bill of materials required to repair a selected component of a unit in a home technology system.

Apply home maintenance technology skills to a selected system requiring repair.

Course Title: Communication Systems

Course Credit: 0.5

COURSE DESCRIPTION: The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of communications systems.

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

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.

Demonstrate knowledge required to maintain and troubleshoot.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at work state and within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

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

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Participate as a member of a team.

Teach others new skills.

Identify skills needed to serve clients/customers.

Demonstrate leadership skills.

Describe strategies necessary for negotiating agreements.

Demonstrate the application of skills necessary to work with people of diverse backgrounds.

Form an understanding and appreciation for work after listening to or observing technology workers.

Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

Form an understanding and appreciation for the roles and work of co-workers.

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

Define terms related to computers.

Identify and describe methods of information acquisition and evaluation.

Discuss advantages and disadvantages in the application of technologies.

Produce a plan to organize and maintain information relevant to emerging technologies.

Comprehend and communicate information relevant to emerging technologies.

Demonstrate the use of computers to process information.

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

Identify and explain the main and subordinate ideas in a written work.

Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.

Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.

Distinguish fact from opinion.

Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.

Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.

Improve one's own writing by restructuring, correcting errors, and rewriting.

Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.

Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.

Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.

Compose unified and coherent correspondence, directions, descriptions, explanations and reports.

Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.

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.

Use the mathematics of:

- integers, fractions, and decimals;

- ratios, proportions, and percentages;
- roots and powers;
- algebra;
- geometry.

Make estimates and approximations, and judge the reasonableness of a result.

Use elementary concepts of probability and statistics.

Draw, read, and analyze graphs, charts, and tables.

Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and fieldwork.

Organize and communicate the results obtained by observation and experimentation.

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).

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).

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

Describe and explain steps in the design/problem-solving process.

Propose solutions to given problems.

Design and implement the optimal solution to a given problem.

Document each step of the design/problem-solving process.

Demonstrate "brainstorming" as a process to solve problems.

Define "critical thinking" and its value in the problem-solving process.

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

Demonstrate knowledge of how social, organizational, and technological systems work.

Explore methods used to monitor and correct performance of technological systems.

Design and implement an optimal solution to a given problem.

Outline major historical technological developments or events.

Identify recent advances in technology.

Explain problem-solving roles of technology.

Forecast a technological development or event.

Define technology.

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display knowledge of the efficient use of human resources.

DEMONSTRATE TECHNOLOGICAL LITERACY ABOUT COMMUNICATIONS SYSTEMS--The student will be able to:

Define communications technology.

Outline major technological developments and events in the history of communications systems technology.

Identify recent advances in communications technology.

Forecast a development or event in communications technology.

APPLY COMMUNICATIONS TECHNOLOGY SKILLS--The student will be able to:

Explain the processes of relief, gravure, screen process, and lithographic printing; bindery operations; photographic reproduction; and electronic communications.

Demonstrate technical knowledge and skills in the preparation of art and copy for printing reproduction.

Design, lay out, and produce a printed product utilizing the above printing processes.

Express knowledge of the basic theory of photography.

Produce a photographic negative and print utilizing the tools, equipment, materials, and processes of photography.

Describe the basic characteristics and specifications of paper, ink, and chemicals used in communications technology.

List ways in which computers are used in communications systems technology.

Operate a computer utilizing a program related to communications technology.

Express a technical knowledge and understanding about electronic communications technology, to include telephone, radio, television, digital data transmission, and satellite communications.

Apply technical knowledge and skills related to one or more of the above areas of electronic communications.

Course Title: Power and Transportation Systems

Course Credit: 0.5

COURSE DESCRIPTION: 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 systems.

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

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.

Demonstrate knowledge required to maintain and troubleshoot.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at work state and within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

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

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Participate as a member of a team.

Teach others new skills.

Identify skills needed to serve clients/customers.

Demonstrate leadership skills.

Describe strategies necessary for negotiating agreements.

Demonstrate the application of skills necessary to work with people of diverse backgrounds.

Form an understanding and appreciation for work after listening to or observing technology workers.

Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

Form an understanding and appreciation for the roles and work of co-workers.

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

Define terms related to computers.

Identify and describe methods of information acquisition and evaluation.

Discuss advantages and disadvantages in the application of technologies.

Produce a plan to organize and maintain information relevant to emerging technologies.

Comprehend and communicate information relevant to emerging technologies.

Demonstrate the use of computers to process information.

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

Identify and explain the main and subordinate ideas in a written work.

Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.

Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.

Distinguish fact from opinion.

Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.

Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.

Improve one's own writing by restructuring, correcting errors, and rewriting.

Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.

Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.

Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.

Compose unified and coherent correspondence, directions, descriptions, explanations and reports.

Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.

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.

Use the mathematics of:

- integers, fractions, and decimals;

- ratios, proportions, and percentages;
- roots and powers;
- algebra;
- geometry.

Make estimates and approximations, and judge the reasonableness of a result.

Use elementary concepts of probability and statistics.

Draw, read, and analyze graphs, charts, and tables.

Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and fieldwork.

Organize and communicate the results obtained by observation and experimentation.

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).

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).

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

Describe and explain steps in the design/problem-solving process.

Propose solutions to given problems.

Design and implement the optimal solution to a given problem.

Document each step of the design/problem-solving process.

Demonstrate "brainstorming" as a process to solve problems.

Define "critical thinking" and its value in the problem-solving process.

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

Demonstrate knowledge of how social, organizational, and technological systems work.

Explore methods used to monitor and correct performance of technological systems.

Design and implement an optimal solution to a given problem.

Outline major historical technological developments or events.

Identify recent advances in technology.

Explain problem-solving roles of technology.

Forecast a technological development or event.

Define technology.

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display knowledge of the efficient use of human resources.

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

Describe sources of thermal energy.

Describe sources of radiant energy.

Describe sources of nuclear energy.

Describe sources of chemical energy.

Describe sources of electrical energy.

Describe sources of mechanical energy.

Describe sources of fluid energy.

DESCRIBE THE APPLICATIONS OF ENERGY TO POWER AND TRANSPORTATION SYSTEMS--The student will be able to:

Explain the uses and applications of thermal energy in generating electrical power.

Discuss how radiant energy is used in our homes.

Describe energy and fuel sources for internal combustion engines.

Identify and define key terms, categories and parts of jet engine power systems.

Identify and explain the uses of hydraulic power in automotive systems.

List the kinds of exhaustible, renewable, and inexhaustible energy resources.

APPLY TECHNOLOGICAL KNOWLEDGE AND SKILLS TO A SELECTED POWER OR TRANSPORTATION SYSTEM--The student will be able to:

Identify a system.

Identify an energy source to be used.

Plan the procedures for designing the system.

Sketch and present the plan to the class.

Course Title: Production Systems

Course Credit: 0.5

COURSE DESCRIPTION: The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of production systems and its effect upon our lives and the choosing of an occupation.

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

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.

Demonstrate knowledge required to maintain and troubleshoot.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at work state and within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

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

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Participate as a member of a team.

Teach others new skills.

Identify skills needed to serve clients/customers.

Demonstrate leadership skills.

Describe strategies necessary for negotiating agreements.

Demonstrate the application of skills necessary to work with people of diverse backgrounds.

Form an understanding and appreciation for work after listening to or observing technology workers.

Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

Form an understanding and appreciation for the roles and work of co-workers.

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

Define terms related to computers.

Identify and describe methods of information acquisition and evaluation.

Discuss advantages and disadvantages in the application of technologies.

Produce a plan to organize and maintain information relevant to emerging technologies.

Comprehend and communicate information relevant to emerging technologies.

Demonstrate the use of computers to process information.

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

Identify and explain the main and subordinate ideas in a written work.

Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.

Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.

Distinguish fact from opinion.

Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.

Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.

Improve one's own writing by restructuring, correcting errors, and rewriting.

Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.

Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.

Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.

Compose unified and coherent correspondence, directions, descriptions, explanations and reports.

Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.

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.

Use the mathematics of:

- integers, fractions, and decimals;

- ratios, proportions, and percentages;
- roots and powers;
- algebra;
- geometry.

Make estimates and approximations, and judge the reasonableness of a result.

Use elementary concepts of probability and statistics.

Draw, read, and analyze graphs, charts, and tables.

Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and fieldwork.

Organize and communicate the results obtained by observation and experimentation.

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).

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).

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

Describe and explain steps in the design/problem-solving process.

Propose solutions to given problems.

Design and implement the optimal solution to a given problem.

Document each step of the design/problem-solving process.

Demonstrate "brainstorming" as a process to solve problems.

Define "critical thinking" and its value in the problem-solving process.

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

Demonstrate knowledge of how social, organizational, and technological systems work.

Explore methods used to monitor and correct performance of technological systems.

Design and implement an optimal solution to a given problem.

Outline major historical technological developments or events.

Identify recent advances in technology.

Explain problem-solving roles of technology.

Forecast a technological development or event.

Define technology.

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display knowledge of the efficient use of human resources.

DEMONSTRATE KNOWLEDGE OF THE PRODUCTION SYSTEMS FOUND IN MODERN INDUSTRIES--The student will be able to:

List and describe the three major types of production activities.

Describe resource processing systems.

Describe product manufacturing systems.

Describe structure construction systems.

Identify recent technological advances in production systems.

DEFINE THE PROCESSES RELATED TO MATERIALS UTILIZED IN MANUFACTURING AND PRODUCTION--The student will be able to:

Define manufacturing.

List and describe six types of secondary manufacturing processes.

List ways in which computers are used in the manufacturing and production systems.

PLAN AND DEVELOP A SYSTEM TO PRODUCE A PRODUCT FROM AVAILABLE MATERIALS--The student will be able to:

Sketch, draw and interpret working drawings.

Use measuring tools and instruments.

Design and construct one or more individual projects utilizing technical skills and processes of woods, metals and plastics technology.

Estimate the cost of the job required to produce the project.

List groups or organizations that represent specialized manufacturing and production skills.

Course Title: Drafting/Illustrative Design Systems

Course Credit: 0.5

COURSE DESCRIPTION: The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of drafting/illustrative and design systems.

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

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.

Demonstrate knowledge required to maintain and troubleshoot.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at work state and within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

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

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Participate as a member of a team.

Teach others new skills.

Identify skills needed to serve clients/customers.

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Define terms related to computers.

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Discuss advantages and disadvantages in the application of technologies.

Produce a plan to organize and maintain information relevant to emerging technologies.

Comprehend and communicate information relevant to emerging technologies.

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

Identify and explain the main and subordinate ideas in a written work.

Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.

Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.

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- algebra;
- geometry.

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Use elementary concepts of probability and statistics.

Draw, read, and analyze graphs, charts, and tables.

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Organize and communicate the results obtained by observation and experimentation.

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Describe and explain steps in the design/problem-solving process.

Propose solutions to given problems.

Design and implement the optimal solution to a given problem.

Document each step of the design/problem-solving process.

Demonstrate "brainstorming" as a process to solve problems.

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

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Explore methods used to monitor and correct performance of technological systems.

Design and implement an optimal solution to a given problem.

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Identify recent advances in technology.

Explain problem-solving roles of technology.

Forecast a technological development or event.

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display knowledge of the efficient use of human resources.

DEMONSTRATE PROPER AND SAFE PROCEDURES AND TECHNICAL KNOWLEDGE AND SKILLS IN THE USE AND CARE OF DRAFTING INSTRUMENTS, MATERIALS AND EQUIPMENT--The student will be able to:

Identify the basic tools and instruments for drafting.

Interpret a blueprint, working drawing or other type of dimensional technical illustration.

Produce a working drawing or technical illustration using drafting tools, instruments, and skills.

DEMONSTRATE TECHNICAL KNOWLEDGE, SKILLS AND APPLICATIONS COMMON TO ALL TYPES OF DRAFTING INCLUDING COMPUTER-AIDED DRAFTING (CAD)--The student will be able to:

Outline major technological developments in the history of drafting and design tools and equipment.

Make freehand sketches.

Produce a drawing using drafting instruments.

Set up a computer to produce a drawing.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING DRAFTING SKETCHES--The student will be able to:

Illustrate a technical idea by means of a sketch.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING ORTHOGRAPHIC DRAWINGS--The student will be able to:

Explain the theory of orthographic projections.

Identify the six principal views of an object.

Produce a three-view orthographic drawing.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING OBLIQUE PICTORIAL DRAWINGS--The student will be able to:

Define types of pictorial drawings.

Produce an oblique pictorial drawing.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING ISOMETRIC PICTORIAL DRAWINGS--The student will be able to:

Discuss the isometric drawing procedures.

Produce an isometric pictorial drawing.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING AERODYNAMIC DRAWINGS--The student will be able to:

Discuss aerodynamic designs of aircraft and automobiles.

Produce an aerodynamic scale drawing.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING A COMPUTER-AIDED DRAWING (CAD)--The student will be able to:

List the major components of a computer-aided drafting system and their functions.

Demonstrate technical knowledge and skills in setting up a CAD system.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR REPRODUCING A COMPUTER-AIDED DRAWING ON A PLOTTER--The student will be able to:

Produce a computer-aided drawing, which can be displayed by means of a computer.

Course Title: Electronics Systems

Course Credit: 0.5

COURSE DESCRIPTION: The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of electronics systems.

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

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.

Demonstrate knowledge required to maintain and troubleshoot.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at work state and within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

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

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Participate as a member of a team.

Teach others new skills.

Identify skills needed to serve clients/customers.

Demonstrate leadership skills.

Describe strategies necessary for negotiating agreements.

Demonstrate the application of skills necessary to work with people of diverse backgrounds.

Form an understanding and appreciation for work after listening to or observing technology workers.

Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

Form an understanding and appreciation for the roles and work of co-workers.

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

Define terms related to computers.

Identify and describe methods of information acquisition and evaluation.

Discuss advantages and disadvantages in the application of technologies.

Produce a plan to organize and maintain information relevant to emerging technologies.

Comprehend and communicate information relevant to emerging technologies.

Demonstrate the use of computers to process information.

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

Identify and explain the main and subordinate ideas in a written work.

Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.

Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.

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- ratios, proportions, and percentages;
- roots and powers;
- algebra;
- geometry.

Make estimates and approximations, and judge the reasonableness of a result.

Use elementary concepts of probability and statistics.

Draw, read, and analyze graphs, charts, and tables.

Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and fieldwork.

Organize and communicate the results obtained by observation and experimentation.

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).

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).

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

Describe and explain steps in the design/problem-solving process.

Propose solutions to given problems.

Design and implement the optimal solution to a given problem.

Document each step of the design/problem-solving process.

Demonstrate "brainstorming" as a process to solve problems.

Define "critical thinking" and its value in the problem-solving process.

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

Demonstrate knowledge of how social, organizational, and technological systems work.

Explore methods used to monitor and correct performance of technological systems.

Design and implement an optimal solution to a given problem.

Outline major historical technological developments or events.

Identify recent advances in technology.

Explain problem-solving roles of technology.

Forecast a technological development or event.

Define technology.

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display knowledge of the efficient use of human resources.

APPLY ELECTRICITY/ELECTRONICS TECHNOLOGY SKILLS--The student will be able to:

Identify and use the basic tools used in electricity/electronics.

Identify and use the basic instruments used in electricity/electronics.

Interpret electricity/electronics wiring diagrams and schematics.

Identify electricity/electronics components.

Explain the use of electricity/electronics components.

Explain the difference between electricity and electronics.

Describe and construct the following electricity circuits: switch controlled lamp holder, three-way switch, four-way switch, split wired receptacle, door buzzers, thermostat, timer, dimmer, photocell, and fluorescent lamp.

DEMONSTRATE TECHNOLOGICAL LITERACY ABOUT ELECTRICITY/ELECTRONICS SYSTEMS--The student will be able to:

Outline major technological developments and events in the history of electricity/electronics.

Identify recent advances in electricity/electronics.

Explain the problem-solving roles of electricity/electronics.

Forecast a development or event in electricity/electronics technology.

Make a technical decision related to electricity/electronics.

Define electricity/electronics technology.

Define solid state, analog and digital systems.

Explain the basic components of electrical/electronics systems.

DEMONSTRATE KNOWLEDGE OF THE ROLE ELECTRONICS PLAYS IN MAGNETIC, OPTICAL, FLUID AND MECHANICAL CONTROL SYSTEMS--The student will be able to:

Identify examples of each type of control system.

Explain the role electronics plays in systems feedback giving examples of everyday use.

Identify by brainstorming new possible applications of control systems to satisfy a need or extend human capabilities.

Course Title: Engineering Systems

Course Credit: 0.5

COURSE DESCRIPTION: The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of engineering systems and its effect upon our lives and the choosing of an occupation.

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

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.

Demonstrate knowledge required to maintain and troubleshoot.

Follow laboratory safety rules and procedures.

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

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Participate as a member of a team.

Teach others new skills.

Identify skills needed to serve clients/customers.

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

Define terms related to computers.

Identify and describe methods of information acquisition and evaluation.

Discuss advantages and disadvantages in the application of technologies.

Produce a plan to organize and maintain information relevant to emerging technologies.

Comprehend and communicate information relevant to emerging technologies.

Demonstrate the use of computers to process information.

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

Identify and explain the main and subordinate ideas in a written work.

Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.

Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.

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

Describe and explain steps in the design/problem-solving process.

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Document each step of the design/problem-solving process.

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

Demonstrate knowledge of how social, organizational, and technological systems work.

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Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display knowledge of the efficient use of human resources.

DEMONSTRATE ENGINEERING ANALYSIS AND DESIGN METHODS--The student will be to:

Define the terms: analysis, design, and applications.

Define the experimental method as it is applied to design.

Describe a design methodology.

Describe simulation.

Prepare a model of a design solution to an engineering problem.

Prepare a graphical solution to an engineering problem.

Prepare a mathematical solution to an engineering problem (using either a calculator or computer).

COMMUNICATE THROUGH ORAL WRITTEN, OR GRAPHIC MEANS, THE RESULTS OF SOLUTIONS OR DESIGNS--The student will be able to:

Understand and interpret basic engineering drawings.

Measure quantities and conduct basic tests according to published procedures.

Use precision measuring tools and instruments to layout, measure and inspect parts or articles.

Sketch objects using multi-view and pictorial principles.

Prepare drawings using basic technical drawing instruments for orthographic and isometric projections.

Use engineering design graphics and descriptive geometry in the solution of design problems.

Describe graphic communications principles.

DEMONSTRATE AND APPLY MECHANICAL, FLUID, ELECTRICAL AND THERMAL SYSTEM PRINCIPLES--The student will be able to:

Assemble, operate, and identify the parts of a system that demonstrates mechanical systems principles.

Assemble, operate, and identify the parts of a system that demonstrates fluid system principles.

Assemble, operate, and identify the parts of a system that demonstrates electrical system principles.

Assemble, operate, and identify the parts of a system that demonstrates thermal system principles.

DEMONSTRATE KNOWLEDGE OF MATERIALS AND PROCESSES--The student will be able to:

Describe the physical and chemical properties of engineering materials in terms of their structure.

List the causes of failure in materials and give procedures to prevent such failure.

Experiment with processes used with metal, woods, polymers, composite materials and adhesives.

USE TOOLS, MACHINES, CALCULATORS, AND COMPUTERS NECESSARY FOR OBTAINING SOLUTIONS TO DESIGN PROBLEMS--The student will be able to:

Demonstrate the use of various graphs to categorize and display data.

Make decisions using graphical data presentations.

Demonstrate the use of a number graph in solving equations.

Use a numerical calculator to solve complex equations either by direct solution or iteration (trial and error).

Use a computer and applications software to solve a design problem by simulation.

Demonstrate graphical vector analysis.

DESCRIBE THE FUNCTIONAL CHARACTERISTICS OF THE ENGINEERING DESIGN TEAM--The student will be able to:

Describe work breakdown organization.

Describe the function of management in general and project management in particular.

Outline a research methodology.

Describe brainstorming.

Course Title: Applied Technology Systems

Course Credit: 0.5

COURSE DESCRIPTION: The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of applied technology systems and its effect upon our lives and the choosing of an occupation.

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

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.

Demonstrate knowledge required to maintain and troubleshoot.

Follow laboratory safety rules and procedures.

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Form an understanding and appreciation for work after listening to or observing technology workers.

Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

Form an understanding and appreciation for the roles and work of co-workers.

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

Define terms related to computers.

Identify and describe methods of information acquisition and evaluation.

Discuss advantages and disadvantages in the application of technologies.

Produce a plan to organize and maintain information relevant to emerging technologies.

Comprehend and communicate information relevant to emerging technologies.

Demonstrate the use of computers to process information.

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

Identify and explain the main and subordinate ideas in a written work.

Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.

Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.

Distinguish fact from opinion.

Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.

Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.

Improve one's own writing by restructuring, correcting errors, and rewriting.

Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.

Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.

Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.

Compose unified and coherent correspondence, directions, descriptions, explanations and reports.

Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.

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.

Use the mathematics of:

- integers, fractions, and decimals;
- ratios, proportions, and percentages;
- roots and powers;
- algebra;
- geometry.

Make estimates and approximations, and judge the reasonableness of a result.

Use elementary concepts of probability and statistics.

Draw, read, and analyze graphs, charts, and tables.

Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and fieldwork.

Organize and communicate the results obtained by observation and experimentation.

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).

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).

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

Describe and explain steps in the design/problem-solving process.

Propose solutions to given problems.

Design and implement the optimal solution to a given problem.

Document each step of the design/problem-solving process.

Demonstrate "brainstorming" as a process to solve problems.

Define "critical thinking" and its value in the problem-solving process.

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

Demonstrate knowledge of how social, organizational, and technological systems work.

Explore methods used to monitor and correct performance of technological systems.

Design and implement an optimal solution to a given problem.

Outline major historical technological developments or events.

Identify recent advances in technology.

Explain problem-solving roles of technology.

Forecast a technological development or event.

Define technology.

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display knowledge of the efficient use of human resources.

DISCUSS THE IMPACT OF TECHNOLOGY ON SOCIETY AND THE ENVIRONMENT--The student will be able to:

Discuss the impact of technology, now and in the future.

Discuss the impacts of technology on work, job opportunities and careers.

Identify the scope of technological impacts.

Identify means of controlling the world impacts of technology.

Discuss expected and unexpected impacts of technology.

Discuss desired and undesired impacts of technology.

Prepare a report on the impact of technology.

DEMONSTRATE AND APPLY MECHANICAL SYSTEM PRINCIPLES--The student will be able to:

Assemble, operate, and identify the parts of a system that demonstrates mechanical system principles.

Demonstrate and apply principles of force, work, rate, resistance, energy, power, and force transformers relating to mechanical systems.

DEMONSTRATE AND APPLY FLUID SYSTEM PRINCIPLES--The student will be able to:

Assemble, operate and identify the parts of a system that demonstrates fluid system principles.

Demonstrate and apply principle of force, work, rate, resistance, energy, power, and force transformers, relating to fluid systems.

DEMONSTRATE AND APPLY ELECTRICAL SYSTEM PRINCIPLES--The student will be able to:

Assemble, operate, and identify the parts of a system that demonstrates electrical system principles.

Demonstrate and apply principles of force, work, rate, resistance, energy, power, and force transformers relating to electrical systems.

DEMONSTRATE AND APPLY THERMAL SYSTEM PRINCIPLES--The student will be able to:

Assemble, operate, and identify the parts of a system that demonstrates thermal system principles.

Demonstrate and apply principles of force, work, rate, resistance, energy, power, and force transformers relating to thermal systems.

DEMONSTRATE THE USE OF A COMPUTER TO INTEGRATE AND CONTROL A SYSTEM COMPOSED OF MECHANICAL, FLUID AND ELECTRICAL SYSTEMS--The student will be able to:

Diagram an integrated system incorporating input, monitoring, controlling, output and feedback components.

Perform experiments using mechanical, fluid and electrical components in an integrated system.

Assemble, operate and identify the parts of computer-controlled mechanical, fluid, and electrical systems.

DEMONSTRATE THE USE OF SENSORS TO CONTROL SYSTEMS--The student will be able to:

Perform experiments using electronic sensors.

Assemble, operate and identify the types of sensors used in technology.

Write a report on the applications of sensors used in technology.

DEMONSTRATE THE USE OF FIBER OPTICS CONCEPTS--The student will be able to:

Write a report on the application of fiber optics used in technology.

Perform fiber optics experiments.

Assemble, operate and identify the parts of a fiber optics system.

DEMONSTRATE THE USE OF LASER OPTICS CONCEPTS--The student will be able to:

Write a report on the applications of laser optics used in technology.

Perform laser optics experiments.

Assemble, operate and identify the parts of a laser optics system.

Course Title: Home Technology Systems

Course Credit: 0.5

COURSE DESCRIPTION: The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of home technology systems and its effect upon our lives and the choosing of an occupation.

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

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.

Demonstrate knowledge required to maintain and troubleshoot.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at work state and within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

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

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Participate as a member of a team.

Teach others new skills.

Identify skills needed to serve clients/customers.

Demonstrate leadership skills.

Describe strategies necessary for negotiating agreements.

Demonstrate the application of skills necessary to work with people of diverse backgrounds.

Form an understanding and appreciation for work after listening to or observing technology workers.

Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

Form an understanding and appreciation for the roles and work of co-workers.

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

Define terms related to computers.

Identify and describe methods of information acquisition and evaluation.

Discuss advantages and disadvantages in the application of technologies.

Produce a plan to organize and maintain information relevant to emerging technologies.

Comprehend and communicate information relevant to emerging technologies.

Demonstrate the use of computers to process information.

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

Identify and explain the main and subordinate ideas in a written work.

Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.

Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.

Distinguish fact from opinion.

Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.

Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.

Improve one's own writing by restructuring, correcting errors, and rewriting.

Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.

Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.

Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.

Compose unified and coherent correspondence, directions, descriptions, explanations and reports.

Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.

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.

Use the mathematics of:

- integers, fractions, and decimals;

- ratios, proportions, and percentages;
- roots and powers;
- algebra;
- geometry.

Make estimates and approximations, and judge the reasonableness of a result.

Use elementary concepts of probability and statistics.

Draw, read, and analyze graphs, charts, and tables.

Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and fieldwork.

Organize and communicate the results obtained by observation and experimentation.

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).

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).

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

Describe and explain steps in the design/problem-solving process.

Propose solutions to given problems.

Design and implement the optimal solution to a given problem.

Document each step of the design/problem-solving process.

Demonstrate "brainstorming" as a process to solve problems.

Define "critical thinking" and its value in the problem-solving process.

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

Demonstrate knowledge of how social, organizational, and technological systems work.

Explore methods used to monitor and correct performance of technological systems.

Design and implement an optimal solution to a given problem.

Outline major historical technological developments or events.

Identify recent advances in technology.

Explain problem-solving roles of technology.

Forecast a technological development or event.

Define technology.

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display knowledge of the efficient use of human resources.

IDENTIFY AND LIST THE DIFFERENT SYSTEMS FOUND IN NEW HOMES UNDER CONSTRUCTION TODAY--The student will be able to:

Identify systems used and install in home construction.

Develop a schedule of routine home system preventative maintenance.

Identify recent advances in home maintenance technology.

DRAW UP A BILL OF MATERIALS REQUIRED TO REPAIR A SELECTED COMPONENT IN A HOME TECHNOLOGY SYSTEM--The student will be able to:

Identify a system component requiring repair.

Identify the problem and parts required to make repairs.

Estimate the cost of repair.

APPLY HOME MAINTENANCE TECHNOLOGY SKILLS TO A SELECTED SYSTEM REQUIRING REPAIR--The student will be able to:

Identify and assemble the tools required to perform the repair.

Demonstrate knowledge of problem-solving approaches to handle home maintenance needs.

Demonstrate consumer technical knowledge about home maintenance tools, materials and equipment.

List ways in which a personal computer may be used for home maintenance purposes.

Program Title: Communications Technology

Occupational Area: Technology Education

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 communications 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. Communications Technology represents the current and expanding digital technology. The content includes, but is not limited to a study of the processes, uses, and technical skills found in visual technologies (both conventional and digital procedures), multimedia production, computer animation and graphics, web page design, electronic media and other new and emerging technologies.

Communications Technology I
Communications Technology II
Communications 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.

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 academic and 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>>.

Laboratory/classroom safety rules and procedures which include but are not limited to the safe use of appropriate tools, operation of equipment and fire prevention precautions must be understood and followed at all times.

The student should demonstrate an understanding of prior grade specific knowledge covered in the national Standards for Technological Literacy* (STL) and the Florida Sunshine State Standards. Benchmarks followed by a reference code indicate alignment with one or both of these documents.

* Standards for Technological Literacy: Content for the Study of Technology.
Copyright 2000 by the International Technology Education Association. Reston,
VA.

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

TECHNOLOGICAL LITERACY STANDARDS

Demonstrate an understanding of the characteristics and scope of technology.

Demonstrate an understanding of the core concepts of technology.

03.0 Demonstrate an understanding of the relationships among technologies and the connections between technology and other fields of study.

Demonstrate an understanding of the cultural, social, economic, and political effects of technology.

Demonstrate an understanding of the influence of technology on history.

Demonstrate an understanding of the attributes of design.

Demonstrate an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Demonstrate abilities to apply the design process.

Demonstrate the abilities to use and maintain technological products and systems.

Demonstrate the abilities to assess the impact of products and systems.

Demonstrate an understanding of and be able to select and use information and communication technologies.

TECHNICAL CONTENT STANDARDS

Demonstrate safe and appropriate use of tools, machines and materials in communications technology.

Demonstrate technical knowledge and skills in the area of design.

Demonstrate technical knowledge and skills in the area of image generation.

Demonstrate technical knowledge and understanding about major printing processes.

Demonstrate technical knowledge and skills in the development of advertising specialties.

Demonstrate technical knowledge and skills in finishing, binding, and packaging.

Demonstrate technical knowledge and skills in digital and electronic communication.

Demonstrate and present a research and design project.

Demonstrate an understanding of career opportunities and requirements in the field of communications technology.

Course Title: Communications Technology I

Course Credit: 1

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

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY--The student will be able to:

Discuss the nature and development of technological knowledge and processes.

STL.1.J, LA.B.2.4, LA.C.3.4, SC.H.3.4

Explain the rapid increase in the rate of technological development and diffusion.

STL.1.K, LA.B.2.4, LA.D.2.4, MA.B.1.4

Conduct specific, goal-directed research related to inventions and innovations.

STL.1.L, LA.A.1.4, LA.A.2.4, LA.B.2.4

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY--The student will be able to:

Identify systems thinking logic and creativity with appropriate compromises in complex real-life problems. STL.2.W

Define technological systems, which are the building blocks of technology, are embedded within larger technological, social, and environmental systems.

STL.2.X, LA.D.2.4

Identify the stability of a technological system and its influence by all of the components in the system, especially those in the feedback loop. STL.2.Y

Identify resources involves trade-offs between competing values, such as availability, cost, desirability, and waste. STL.2.Z, SS.D.1.4

Identify the criteria and constraints of a product or system and determine how they affect the final design and development. STL.2.AA, MA.A.5.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.3.4, SC.H.1.4

Define a management system as the process of planning, organizing, and controlling work. STL.2.EE

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTIONS BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY--The student will be able to:

Identify technology transfer occurring when a new user applies an existing innovation developed for one purpose in a different function. STL.3.G, SC.H.3.4

Identify technological innovation resulting when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields. STL.3.H, SC.H.3.4

Outline the process of patenting to protect a technological idea. STL.3.I

Identify technological progresses that promote the advancement of science and mathematics. STL.3.J, LA.A.1.4, LA.B.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY--The student will be able to:

Identify changes caused by the use of technology ranging from gradual to rapid and from subtle to obvious. STL.4.H

Classify the use of technology involving weighing the trade-offs between the positive and negative effects. STL.4.I, LA.B.2.4

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY--The student will be able to:

Describe how most technological development has been evolutionary, the result of a series of refinements to a basic invention. STL.7.G, LA.B.1.4, SS.A.1.4

Research how the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials. STL.7.H, LA.A.1.4, LA.A.2.4, LA.B.2.4, SC.H.3.4, SS.A.2.4

Define the history of technology as a powerful force in reshaping the social, cultural, political, and economic landscape. STL.7.I, LA.D.2.4, SS.A.2.4

Define the Industrial Revolution and the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time. STL.7.N, SS.A.5.4

Define the Information Age and its placement of emphasis on the processing and exchange of information. STL.7.O, SS.A.5.4

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN--The student will be able to:

Recognize the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results. STL.8.H

Restate design problems that are seldom presented in a clearly defined form.

STL.8.I, LA.D.1.4, LA.D.2.4

Check and critique a design continually, and improve and revise the idea of the design as needed. STL.8.J, SC.H.1.4

List competing requirements of a design, such as criteria, constraints, and efficiency. STL.8.K, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING--The

student will be able to:

Define research and development as a specific problem-solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace. STL.10.I

Identify research needed to solve technological problems. STL.10.J, LA.A.1.4, LA.A.2.4

Differentiate between technological and non-technological problems, and identify which problems can be solved using technology. STL.10.K, SC.H.1.4

Utilize a multidisciplinary approach to solving technological problems. STL.10.L, MA.A.1.4, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.1.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE ABILITIES TO APPLY THE DESIGN PROCESS--The student will be able to:

Identify the design problem to solve and decide whether or not to address it. STL.11.M, SC.H.1.4

Identify criteria and constraints and determine how these will affect the design process. STL.11.N, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4, SC.H.1.4, SC.H.3.4

Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product. STL.11.O, SC.H.3.4

Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed. STL.11.P, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, SC.H.1.4, SC.H.3.4

Develop and produce a product or system using a design process. STL.11.Q

Evaluate final solutions and communicate observation, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written

means, in addition to three-dimensional models. STL.11.R, LA.B.2.4, LA.C.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN

TECHNOLOGICAL PRODUCTS AND SYSTEMS--The student will be able to:

Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques. STL.12.L, LA.B.1.4, LA.B.2.4, LA.C.3.4

Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it. STL.12.M

Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision. STL.12.N

Operate systems so that they function in the way they were designed. STL.12.O

Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate. STL.12.P, LA.A.2.4, MA.E.1.4

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS

AND SYSTEMS--The student will be able to:

Collect information and evaluate its quality. STL.13.J, LA.A.2.4, SC.H.1.4

Evaluate data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and environment. STL.13.K, LA.A.2.4, SC.G.1.4, SC.G.2.4, SC.H.1.4

Use assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology. STL.13.L, LA.A.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4

Identify forecasting techniques to evaluate the results of altering natural systems. STL.13.M, MA.E.3.4, SC.G.2.4

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND

USE INFORMATION AND COMMUNICATION TECHNOLOGIES—The student will be able to:

Discuss information and communication technologies including the inputs, processes, and outputs associated with sending and receiving information. STL.17.L

Classify information and communication systems that allow information to be transferred from human to human, human to machine, machine to human, and machine to machine. STL.17.M

Use information and communication systems to inform, persuade, entertain, control, manage, and educate. STL.17.N

Identify components of a communication system, including source, encoder, transmitter, receiver, decoder, storage, retrieval, and destination. STL.17.O
Identify many ways to communicate information, such as graphic and electronic means. STL.17.P

Communicate technological knowledge and processes using symbols, measurement, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli. STL.17.Q

DEMONSTRATE SAFE AND APPROPRIATE USE OF TOOLS, MACHINES, AND MATERIALS IN COMMUNICATIONS TECHNOLOGY--The student will be able to:

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to manufacture a product.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at workstation within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE AREA OF DESIGN--The student will be able to:

Understand elements and principles of design.

Understand basic types of layouts. LA.C.2.4, LA.D.2.4

Understand copy preparation and proofreading. LA.B.1.4

Develop specifications for a particular job.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE AREA OF IMAGE GENERATION--The student will be able to:

Understand the differences between manual paste-up and electronic page layout.

Identify distinct elements in a layout. LA.C.2.4, LA.D.2.4

Demonstrate the creation of a layout using paste-up techniques.

Demonstrate knowledge and operation of desktop publishing software.

Demonstrate working knowledge of clip art/stock images.

Understand legalities of using preexisting images (copyright/trademark).

LA.D.2.4

Generate images utilizing a variety of digital technologies.

Understand and use appropriate file formats.

Identify different types of optical reproduction systems. SC.F.1.4

Apply the procedures for set up, exposing, film processing, correcting problems, and clean-up. SA.A.1.4

Produce a negative, print, hologram or video. VA.A.1.4

EXPRESS TECHNICAL KNOWLEDGE AND UNDERSTANDING OF MAJOR PRINTING PROCESSES--The student will be able to:

Explain and demonstrate pre-press operations.

Demonstrate an understanding of the process of letterpress printing.

Demonstrate an understanding of the process of gravure printing.

Demonstrate an understanding of the process of screen printing.

Demonstrate an understanding of the process of lithographic printing.

Demonstrate an understanding of the process of digital printing.

Demonstrate an understanding of the process of projection printing.

Demonstrate an understanding of the lithographic offset press process.

Explain the difference between printing and duplicating processes. LA.B.2.4

Design and layout copy for single-color printing project. VA.1.1.2, VA.1.1.3, VA.1.1.4, VA.2.1.2, VA.2.1.2, VA.2.1.4, VA.4.1.3, LA.1.1.1, LA.1.1.3, LA.2.2.1

Produce a printing project.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE DEVELOPMENT OF ADVERTISING SPECIALTIES--The student will be able to:

Explain modern trends in sign making and imprinted advertising specialties.

SS.A.1.4

Explain the various technologies associated with these industries.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN DIGITAL AND ELECTRONIC COMMUNICATION--The student will be able to:

Demonstrate effective use of the internet to locate and evaluate information.

LA.A.2.4

Distribute information electronically. LA.D.2.4

Identify effective design methods for presenting information digitally. LA.C.2.4, LA.D.2.4

Explain the history of electronic media and its role in the mass media and society. SS.A.1.4, SS.B.2.4

Demonstrate key roles in each stage of the production process.

Organize a set for an electronic media production.

Demonstrate ability to select appropriate media topics, equipment, and materials for an electronic media production.

Identify and write different types of script copy.
Produce an electronic media project. LA.B.1.4, LA.B.2.4

Course Title: Communications Technology II

Course Credit: 1

COURSE DESCRIPTION: This course provides students with intermediate understanding of the knowledge, human relations, and technical skills of communications technology.

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY--The student will be able to:

Illustrate the nature and development of technological knowledge and processes.

STL.1.J, LA.B.2.4, LA.C.3.4, SC.H.3.4

Graph the rapid increase in the rate of technological development and diffusion.

STL.1.K, LA.B.2.4, LA.D.2.4, MA.B.1.4

Conduct specific, goal-directed research related to inventions and innovations.

STL.1.L, LA.A.1.4, LA.A.2.4, LA.B.2.4

Evaluate current technological developments that are driven by profit motives and the market. STL.1.M, SS.D.1.4

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY--The student will be able to:

Apply systems thinking logic and creativity with appropriate compromises in complex real-life problems. STL.2.W

Discuss technological systems, which are the building blocks of technology, are embedded within larger technological, social, and environmental systems.

STL.2.X, LA.D.2.4

Assess the stability of a technological system and its influence by all of the components in the system, especially those in the feedback loop. STL.2.Y

Select resources involving trade-offs between competing values, such as availability, cost, desirability, and waste. STL.2.Z, SS.D.1.4

Identify the criteria and constraints of a product or system and determine how they affect the final design and development. STL.2.AA, MA.A.5.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.3.4, SC.H.1.4

Implement strategies for optimizing a technological process or methodology of designing or making a product, dependent on criteria and constraints. STL.2.CC

Organize a management system as the process of planning, organizing, and controlling work. STL.2.EE

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTIONS BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY--The student will be able to:

Discuss technology transfer occurring when a new user applies an existing innovation developed for one purpose in a different function. STL.3.G, SC.H.3.4
Explain technological innovation resulting when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields. STL.3.H, SC.H.3.4

Report the process of patenting to protect a technological idea. STL.3.I

Discuss technological progresses that promote the advancement of science and mathematics. STL.3.J, LA.A.1.4, LA.B.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY--The student will be able to:

Identify changes caused by the use of technology ranging from gradual to rapid and from subtle to obvious. STL.4.H

Classify the use of technology involving weighing the trade-offs between the positive and negative effects. STL.4.I, LA.B.2.4

List the cultural, social, economic, and political changes caused by the transfer of technology from one society to another. STL.4.K, LA.B.2.4, LA.E.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY--The student will be able to:

Describe how most technological development has been evolutionary, the result of a series of refinements to a basic invention. STL.7.G, LA.B.1.4, SS.A.1.4

Discuss how the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials. STL.7.H, LA.A.1.4, LA.A.2.4, LA.B.2.4, SC.H.3.4, SS.A.2.4

Research the history of technology as a powerful force in reshaping the social, cultural, political, and economic landscape. STL.7.I, LA.D.2.4, SS.A.2.4

Debate that early in the history of technology, the development of many tools and machines was not based on scientific knowledge, but on technological know-how. STL.7.J, SS.A.1.4

Discuss the Industrial Revolution and the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time. STL.7.N, SS.A.5.4

Discuss the Information Age and its placement of emphasis on the processing and exchange of information. STL.7.O, SS.A.5.4

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN--
The student will be able to:

Describe the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results. STL.8.H

Translate design problems that are seldom presented in a clearly defined form. STL.8.I, LA.D.1.4, LA.D.2.4

Evaluate a design continually, and improve and revise the idea of the design as needed. STL.8.J, SC.H.1.4

Analyze competing requirements of a design, such as criteria, constraints, and efficiency. STL.8.K, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING--The

student will be able to:

Employ research and development as a specific problem solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace. STL.10.I

Conduct research needed to solve technological problems. STL.10.J, LA.A.1.4, LA.A.2.4

Differentiate between technological and non-technological problems, and identify which problems can be solved using technology. STL.10.K, SC.H.1.4

Utilize a multidisciplinary approach to solving technological problems. STL.10.L, MA.A.1.4, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.1.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE ABILITIES TO APPLY THE DESIGN PROCESS--The student will be able to:

Interpret the design problem to solve and decide whether or not to address it. STL.11.M, SC.H.1.4

Evaluate criteria and constraints and determine how these will affect the design process. STL.11.N, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4, SC.H.1.4, SC.H.3.4

Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product. STL.11.O, SC.H.3.4

Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and

to note areas where improvements are needed. STL.11.P, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, SC.H.1.4, SC.H.3.4

Develop and produce a product or system using a design process. STL.11.Q
Evaluate final solutions and communicate observation, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models. STL.11.R, LA.B.2.4, LA.C.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN

TECHNOLOGICAL PRODUCTS AND SYSTEMS--The student will be able to:

Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques. STL.12.L, LA.B.1.4, LA.B.2.4, LA.C.3.4

Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it. STL.12.M

Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision. STL.12.N

Operate systems so that they function in the way they were designed. STL.12.O

Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate. STL.12.P, LA.A.2.4, MA.E.1.4

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS

AND SYSTEMS--The student will be able to:

Collect information and evaluate its quality. STL.13.J, LA.A.2.4, SC.H.1.4

Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and environment. STL.13.K, LA.A.2.4, SC.G.1.4, SC.G.2.4, SC.H.1.4

Apply assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology. STL.13.L, LA.A.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4

Design forecasting techniques to evaluate the results of altering natural systems. STL.13.M, MA.E.3.4, SC.G.2.4

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND

USE INFORMATION AND COMMUNICATION TECHNOLOGIES—The student will be able to:

Discuss information and communication technologies including the inputs, processes, and outputs associated with sending and receiving information. STL.17.L

Classify information and communication systems that allow information to be transferred from human to human, human to machine, machine to human, and machine to machine. STL.17.M

Use information and communication systems to inform, persuade, entertain, control, manage, and educate. STL.17.N

Identify components of a communication system, including source, encoder, transmitter, receiver, decoder, storage, retrieval, and destination. STL.17.O

Identify many ways to communicate information, such as graphic and electronic means. STL.17.P

Communicate technological knowledge and processes using symbols, measurement, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli. STL.17.Q

DEMONSTRATE SAFE AND APPROPRIATE USE OF TOOLS, MACHINES, AND MATERIALS IN COMMUNICATIONS TECHNOLOGY--The student will be able to:

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to manufacture a product.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at workstation within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE AREA OF DESIGN--The student will be able to:

Demonstrate how to represent type and graphic elements in a rough layout.

LA.B.1.4, LA.B.2.4

Describe the effects of various printing technologies on the design process.

Describe how a project's purpose, mood and audience affect the design process.

LA.B.2.4, LA.D.2.4

Demonstrate advanced organizational structures in layout and design. LA.B.2.4

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE AREA OF IMAGE GENERATION--The student will be able to:

Access digital images from a variety of sources.

Create various graphs from statistical information.
Create a technical drawing from a photograph.
Demonstrate digital image generation and modification techniques.

EXPRESS TECHNICAL KNOWLEDGE AND UNDERSTANDING USING MAJOR PRINTING PROCESSES--The student will be able to:

Explain major technological advances in the printing industry. SS.A.1.4
Use proper technical skills in the layout, preparation, production, and finishing of a printed project. MA.2.2.1, MA.3.1, HE.2.1.1, VA 2.1.2, VA 2.1.4, VA 4.1.3
Analyze and choose appropriate materials for complex printing applications.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN FINISHING, BINDING AND PACKAGING--The student will be able to:

Describe standard binding, finishing and packaging processes. LA 1.1.1, VA 1.1.3, MA 2.2.1
Demonstrate the proper and safe use of binding, finishing, and packaging equipment. LA 1.1.1, VA 1.1.3, MA 2.2.1
Describe the processes of scoring, folding, gathering, and collating. LA 1.1.1, VA 1.1.3, MA 2.2.1
Finish and bind a printed product using the proper technical skills. LA 1.1.1, VA 1.1.3, MA 2.2.1
Demonstrate proper packaging for a printed project.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN DIGITAL AND ELECTRONIC COMMUNICATION--The student will be able to:

Demonstrate knowledge of terms and principles associated with web page design.
Process graphic images in formats appropriate for a web page.
Create and use background patterns.
Create and format text.
Use web design and layout software to produce web pages to a specified design.
Create and use hypertext links.
Use a File Transfer Protocol program or other method to upload web pages to a server.
Demonstrate ability to write script to broadcast style.
Write, produce, and direct a variety of electronic media projects. LA.D.2.4
Perform video recording and editing operations.

Course Title: Communications Technology III

Course Credit: 1

COURSE DESCRIPTION: This course provides students with advanced knowledge of the human relations and technical skills of printing, graphic, digital, and electronic communications technology.

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY--The student will be able to:

Illustrate the nature and development of technological knowledge and processes.

STL.1.J, LA.B.2.4, LA.C.3.4, SC.H.3.4

Graph the rapid increase in the rate of technological development and diffusion.

STL.1.K, LA.B.2.4, LA.D.2.4, MA.B.1.4

Conduct specific, goal-directed research related to inventions and innovations.

STL.1.L, LA.A.1.4, LA.A.2.4, LA.B.2.4

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY--The student will be able to:

Apply systems thinking logic and creativity with appropriate compromises in complex real-life problems. STL.2.W

Assess technological systems, which are the building blocks of technology, are embedded within larger technological, social, and environmental systems.

STL.2.X, LA.D.2.4

Assess the stability of a technological system and its influence by all of the components in the system, especially those in the feedback loop. STL.2.Y

Compare resources involves trade-offs between competing values, such as availability, cost, desirability, and waste. STL.2.Z, SS.D.1.4

Identify the criteria and constraints of a product or system and determine how they affect the final design and development. STL.2.AA, MA.A.5.4, MA.B.1.4,

MA.B.3.4, MA.B.4.4, MA.E.3.4, SC.H.1.4

Propose strategies for optimizing a technological process or methodology of designing or making a product, dependent on criteria and constraints. STL.2.BB

Develop a management system as the process of planning, organizing, and controlling work. STL.2.EE

Outline complex systems that have many layers of controls and feedback loops to provide information. STL.2.FF

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTIONS BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY--The student will be able to:

Create technology transfer occurring when a new user applies an existing innovation developed for one purpose in a different function. STL.3.G, SC.H.3.4
Examine technological innovation resulting when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields. STL.3.H, SC.H.3.4
Report the process of patenting to protect a technological idea. STL.3.I
Investigate technological progresses that promote the advancement of science and mathematics. STL.3.J, LA.A.1.4, LA.B.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY--The student will be able to:

Evaluate the use of technology involving weighing the trade-offs between the positive and negative effects. STL.4.I, LA.B.2.4
Discuss ethical considerations important in the development, selection, and use of technologies. STL.4.J, SC.H.1.4, SS.C.2.4
Debate the cultural, social, economic, and political changes caused by the transfer of technology from one society to another. STL.4.K, LA.B.2.4, LA.E.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY--The student will be able to:

Assess how most technological development has been evolutionary, the result of a series of refinements to a basic invention. STL.7.G, LA.B.1.4, SS.A.1.4
Evaluate how the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials. STL.7.H, LA.A.1.4, LA.A.2.4, LA.B.2.4, SC.H.3.4, SS.A.2.4
Discuss the Information Age and its placement of emphasis on the processing and exchange of information. STL.7.O, SS.A.5.4

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN--

The student will be able to:

Implement the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results. STL.8.H
Translate design problems that are seldom presented in a clearly defined form. STL.8.I, LA.D.1.4, LA.D.2.4

Evaluate a design continually, and improve and revise the idea of the design as needed. STL.8.J, SC.H.1.4

Analyze competing requirements of a design, such as criteria, constraints, and efficiency. STL.8.K, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING--The

student will be able to:

Employ research and development as a specific problem solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace. STL.10.I

Conduct research needed to solve technological problems. STL.10.J, LA.A.1.4, LA.A.2.4

Differentiate between technological and non-technological problems, and identify which problems can be solved using technology. STL.10.K, SC.H.1.4

Utilize a multidisciplinary approach to solving technological problems. STL.10.L, MA.A.1.4, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.1.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE ABILITIES TO APPLY THE DESIGN PROCESS--The student will be able to:

Interpret the design problem to solve and decide whether or not to address it. STL.11.M, SC.H.1.4

Evaluate criteria and constraints and determine how these will affect the design process. STL.11.N, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4, SC.H.1.4, SC.H.3.4

Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product. STL.11.O, SC.H.3.4

Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed. STL.11.P, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, SC.H.1.4, SC.H.3.4

Develop and produce a product or system using a design process. STL.11.Q

Evaluate final solutions and communicate observation, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models. STL.11.R, LA.B.2.4, LA.C.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN

TECHNOLOGICAL PRODUCTS AND SYSTEMS--The student will be able to:

Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques. STL.12.L, LA.B.1.4, LA.B.2.4, LA.C.3.4

Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it. STL.12.M

Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision. STL.12.N

Operate systems so that they function in the way they were designed. STL.12.O

Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate. STL.12.P, LA.A.2.4, MA.E.1.4

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS

AND SYSTEMS--The student will be able to:

Collect information and evaluate its quality. STL.13.J, LA.A.2.4, SC.H.1.4

Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and environment. STL.13.K, LA.A.2.4, SC.G.1.4, SC.G.2.4, SC.H.1.4

Apply assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology. STL.13.L, LA.A.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4

Design forecasting techniques to evaluate the results of altering natural systems. STL.13.M, MA.E.3.4, SC.G.2.4

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND

USE INFORMATION AND COMMUNICATION TECHNOLOGIES—The student will be able to:

Discuss information and communication technologies including the inputs, processes, and outputs associated with sending and receiving information. STL.17.L

Classify information and communication systems that allow information to be transferred from human to human, human to machine, machine to human, and machine to machine. STL.17.M

Use information and communication systems to inform, persuade, entertain, control, manage, and educate. STL.17.N

Identify components of a communication system, including source, encoder, transmitter, receiver, decoder, storage, retrieval, and destination. STL.17.O

Identify many ways to communicate information, such as graphic and electronic means. STL.17.P

Communicate technological knowledge and processes using symbols, measurement, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli. STL.17.Q

DEMONSTRATE SAFE AND APPROPRIATE USE OF TOOLS, MACHINES, AND MATERIALS IN COMMUNICATIONS TECHNOLOGY--The student will be able to:

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to manufacture a product.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at workstation within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE AREA OF DESIGN--The student will be able to:

Describe how a project's purpose, mood and audience affect the design process.

LA.B.1.4, LA.B.2.4

Demonstrate advanced typographic principles and operations.

Demonstrate advanced organizational structures in layout and design. LA.B.2.4

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE AREA OF IMAGE GENERATION--The student will be able to:

Troubleshoot and correct problems associated with the production of photographic images. LA.1.1.2, LA.1.2.1, SC.1.1.3, SC 2.1.2, SC.2.1.4, SC8.3.6, SS.1.1, VA 1.1.1, VA 1.1.2, VA 1.2.3

Access digital images from a variety of sources.

Create various graphs from statistical information.

Create a technical drawing from a photograph.

Demonstrate advanced digital image generation and modification techniques.

Choose the correct resolution for a given output device.

Troubleshoot and correct problems related to 'preflight operations' in a layout.

EXPRESS TECHNICAL KNOWLEDGE AND UNDERSTANDING USING MAJOR PRINTING PROCESSES--The student will be able to:

Explain major technological advances in the printing industry.

Use proper technical skills in the layout, preparation, production, and finishing of a printed project. MA.2.2.1, MA.3.1, HE.2.1.1, VA 2.1.2, VA 2.1.4, VA 4.1.3

Analyze and choose appropriate materials for complex printing applications.

Demonstrate advanced understanding of a variety of printing processes.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN DIGITAL AND ELECTRONIC COMMUNICATION--The student will be able to:

Plan, organize, design, and produce an internet web site.

Develop and use strategies for web site management.

Troubleshoot web site problems.

Explore and utilize alternative Internet formats.

Demonstrate basic techniques for shooting video.

Demonstrate basic video editing techniques.

Demonstrate basic audio editing techniques.

Use multi-media software to integrate a variety of text, graphic, video, and animated media elements into a presentation.

DEMONSTRATE AND PRESENT A RESEARCH AND DESIGN PROJECT--The student will be able to:

Identify and research a design problem related to a developing technology.

LA.A.1.4, LA.A.2.4, SC.A.1.4, SC.D.2.4, SC.E.2.4, SC.H.1.4, SC.H.3.4

Identify criteria and constraints for a design project. LA.A.1.4, SC.H.3.4

Produce a detailed design and plan for the production of the solution. MA.B.4.4, SC.E.2.4, SC.H.3.4

Complete an advanced communications project. MA.E.3.4, SC.H.1.4, SC.H.3.4

Deliver a professional quality presentation of the design process and solution.

LA.A.1.4, LA.A.2.4, LA.C.3.4

DEMONSTRATE AN UNDERSTANDING OF CAREER OPPORTUNITIES AND REQUIREMENTS IN THE FIELD OF COMMUNICATIONS TECHNOLOGY--The student will be able to:

Discuss individual interests related to a career in communications technology.

LA.B.2.4

Explore career opportunities related to a career in communications technology.

LA.A.1.4, LA.A.2.4, LA.B.2.4

Explore secondary education opportunities related to communications technology.

LA.A.1.4, LA.A.2.4, LA.B.2.4

Conduct a job search. LA.A.1.4, LA.A.2.4

Complete a job application form correctly. LA.B.2.4

Demonstrate competence in job interview techniques. LA.C.1.4, LA.C.3.4,
LA.D.1.4

Create a professional resume and letter of introduction. LA.A.1.4, LA.A.2.4,
LA.B.1.4, LA.B.2.4

Solicit awards, letters of recommendation and recognition. LA.A.1.4, LA.A.2.4,
LA.C.3.4, LA.D.1.4

Organize work samples in a professional, presentable format. LA.B.2.4, LA.C.3.4,
LA.D.1.4

Program Title: Construction Technology
Occupational Area: Technology Education

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 construction 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 the tools, materials, processes, and technical skills of construction technology. 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.

Construction Technology I
Construction Technology II
Construction 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.

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>>.

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

Demonstrate the ability to work safely with a variety of technologies.
Demonstrate interpersonal skills as they relate to the workplace.
Identify and apply methods of information acquisition and utilization.

Apply basic skills in communications, mathematics, and science appropriate to technological content and learning activities.

Demonstrate and apply design/problem-solving processes.

Express an understanding of technological systems and their complex interrelationships.

Demonstrate the ability to properly identify, organize, plan, and allocate resources.

Discuss individual interests and aptitudes as they relate to a career.

Demonstrate employability skills.

Demonstrate an understanding of entrepreneurship.

Make an informed and meaningful career choice.

Demonstrate basic technical knowledge and skills about construction technology.

Demonstrate technical knowledge and skills about selecting and preparing a construction site.

Demonstrate technical knowledge and skills about designing and engineering constructed works.

Demonstrate technical knowledge and skills about contracting, estimating, bidding, and scheduling.

Demonstrate technical knowledge and skills about constructing substructures.

Demonstrate technical knowledge and skills about constructing superstructures.

Demonstrate technical knowledge and skills about installing utilities.

Demonstrate technical knowledge and skills about enclosing superstructures.

Demonstrate technical knowledge and skills about interior and exterior finishing of a constructed structure.

Apply advanced technical knowledge and skills about construction technology.

Demonstrate technical knowledge and skills about selecting and preparing a construction site.

Demonstrate technical knowledge and skills about designing and engineering constructed works.

Demonstrate technical knowledge and skills about contracting, estimating, bidding, and scheduling.

Demonstrate technical knowledge and skills about constructing substructures.

Demonstrate technical knowledge and skills about constructing superstructures.

Demonstrate technical knowledge and skills about installing utilities.

Demonstrate technical knowledge and skills about enclosing superstructures.

Demonstrate technical knowledge and skills about interior and exterior finishing of a constructed structure.

Perform advanced study and technical skills related to construction technology.

Operate a computer utilizing a program related to construction technology.

Demonstrate technical knowledge and skills about regional planning and the construction of civil or community structures.

Conduct structural tests on constructed structures and construction materials.

Conduct a research and experimentation project on a construction technology process or material.

Course Title: Construction Technology I

Course Credit: 1

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

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

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.

Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at work station within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

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

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Participate as a member of a team.

Teach others new skills.

Identify skills needed to serve clients/customers.

Demonstrate leadership skills.

Describe strategies necessary for negotiating agreements.

Demonstrate the application of skills necessary to work with people of diverse backgrounds.

Form an understanding and appreciation for work after listening to or observing technology workers.

Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

Form an understanding and appreciation for the roles and work of co-workers.

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

Define terms related to computers.

Identify and describe methods of information acquisition and evaluation.

Discuss advantages and disadvantages in the application of technologies.

Produce a plan to organize and maintain information relevant to emerging technologies.

Comprehend and communicate information relevant to emerging technologies.

Demonstrate the use of computers to process information.

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

Identify and explain the main and subordinate ideas in a written work.

Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.

Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.

Distinguish fact from opinion.

Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.

Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.

Improve one's own writing by restructuring, correcting errors, and rewriting.

Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.

Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.

Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.

Compose unified and coherent correspondence, directions, descriptions, explanations and reports.

Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.

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.

Use the mathematics of:

- integers, fractions, and decimals;

- ratios, proportions, and percentages;
- roots and powers;
- algebra;
- geometry.

Make estimates and approximations, and judge the reasonableness of a result.

Use elementary concepts of probability and statistics.

Draw, read, and analyze graphs, charts, and tables.

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.

Organize and communicate the results obtained by observation and experimentation.

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).

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).

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

Describe and explain steps in the design/problem-solving process.

Propose solutions to given problems.

Design and implement the optimal solution to a given problem.

Document each step of the design/problem-solving process.

Demonstrate "brainstorming" as a process to solve problems.

Define "critical thinking" and its value in the problem-solving process.

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

Demonstrate a knowledge of how social, organizational, and technological systems work.

Explore methods used to monitor and correct performance of technological systems.

Design and implement an optimal solution to a given problem.

Outline major historical technological developments or events.

Identify recent advances in technology.

Explain problem-solving roles of technology.

Forecast a technological development or event.

Define technology.

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display a knowledge of the efficient use of human resources.

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

Describe individual strengths and weaknesses.

Discuss individual interests related to a career.

Identify careers within specific areas of technology.

Explore careers within specific areas of interest.

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

Conduct a job search.

Secure information about a career.

Identify documents that may be required when applying for a job interview.

Complete a job application form correctly.

Demonstrate competence in job interview techniques.

Prepare a resume for a job.

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

Define entrepreneurship.

Describe the importance of entrepreneurship to the American economy.

List the advantages and disadvantages of business ownership.

Identify the risks involved in ownership of a business.

Identify the necessary personal characteristics of a successful entrepreneur.

Identify the business skills needed to operate a small business efficiently and effectively.

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

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

Review tentative occupational choices based on the information learned and interest developed in this course.

DEMONSTRATE BASIC TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTION TECHNOLOGY--The student will be able to:

Demonstrate basic technical knowledge and skills about student performance standards 14.01 through 21.02.

Demonstrate basic technical knowledge and skills in the construction of a structure.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT SELECTING AND PREPARING A CONSTRUCTION SITE--The student will be able to:

Explain the steps and processes for identifying, negotiating, selecting, and acquiring sites for construction.

Explain and perform the elementary technical skills for surveying or mapping a construction site.

Describe the tools, equipment, and technical skills required for excavating a construction site.

Explain the load bearing importance of the earth and the reason for soils testing at a construction site.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT DESIGNING AND ENGINEERING CONSTRUCTED WORKS--The student will be able to:

Read and interpret architectural drawings, blueprints, symbols, and construction plans.

Describe building codes, permits, and inspection requirements.

Sketch or draw a plan for a construction project.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONTRACTING, ESTIMATING, BIDDING, AND SCHEDULING--The student will be able to:

Estimate construction costs using various methods including a computer.

Read and prepare bid invitations for contractors to build a construction project.

Establish criteria for awarding a construction contract.

Describe the content of a construction contract and performance bond.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTING SUBSTRUCTURES--The student will be able to:

Describe the types, parts, and purposes of foundations.
Describe the tools, materials, and processes for setting foundations.
Mix, place, and finish concrete for a floor, wall, or footing.
Perform the masonry technical skills of laying brick or block.

**DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT
CONSTRUCTING SUPERSTRUCTURES**--The student will be able to:

Describe mass, solid wall, frame, and air-supported superstructures.
Describe the materials used in the construction of superstructures.
Use technical carpentry skills, tools, and materials in constructing a wood frame superstructure.
Use technical construction skills in building a steel or concrete frame superstructure.
Describe factory manufacturing of superstructures and modules.

**DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT
INSTALLING UTILITIES**--The student will be able to:

Describe public utility systems for supplying water, electricity, natural gas, and sewerage.
Describe the functions and operation of heating, cooling, and ventilating systems.
Demonstrate a technical knowledge of plumbing and electrical systems in homes or buildings.
Use the technical tools and skills to install plumbing and electrical systems utilities.
Diagnose and troubleshoot problems with utility systems.

**DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT
ENCLOSING SUPERSTRUCTURES**--The student will be able to:

Describe the different types of materials and methods for constructing interior and exterior walls.
Describe the different types of materials and methods for laying floors and for building roofs.
Describe the different types of methods for constructing or installing windows and doors.
Describe the purposes, materials, and methods for insulating enclosed superstructures.
Perform the technical skills of enclosing a superstructure.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INTERIOR AND EXTERIOR FINISHING OF A CONSTRUCTED STRUCTURE--The student

will be able to:

Describe the different types of materials and methods for trimming, painting, and decorating a constructed structure.

Describe the types of accessories and fixtures that are installed to finish completed construction.

Explain the materials and methods used for the finishing processes of paving and landscaping.

Participate in processes of finishing a construction project and site.

Course Title: Construction Technology II

Course Credit: 1

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

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

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.

Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at work station within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

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

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Participate as a member of a team.

Teach others new skills.

Identify skills needed to serve clients/customers.

Demonstrate leadership skills.

Describe strategies necessary for negotiating agreements.

Demonstrate the application of skills necessary to work with people of diverse backgrounds.

Form an understanding and appreciation for work after listening to or observing technology workers.

Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

Form an understanding and appreciation for the roles and work of co-workers.

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

Define terms related to computers.

Identify and describe methods of information acquisition and evaluation.

Discuss advantages and disadvantages in the application of technologies.

Produce a plan to organize and maintain information relevant to emerging technologies.

Comprehend and communicate information relevant to emerging technologies.

Demonstrate the use of computers to process information.

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

Identify and explain the main and subordinate ideas in a written work.

Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.

Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.

Distinguish fact from opinion.

Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.

Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.

Improve one's own writing by restructuring, correcting errors, and rewriting.

Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.

Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.

Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.

Compose unified and coherent correspondence, directions, descriptions, explanations and reports.

Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.

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.

Use the mathematics of:

- integers, fractions, and decimals;

- ratios, proportions, and percentages;
- roots and powers;
- algebra;
- geometry.

Make estimates and approximations, and judge the reasonableness of a result.

Use elementary concepts of probability and statistics.

Draw, read, and analyze graphs, charts, and tables.

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.

Organize and communicate the results obtained by observation and experimentation.

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).

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).

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

Describe and explain steps in the design/problem-solving process.

Propose solutions to given problems.

Design and implement the optimal solution to a given problem.

Document each step of the design/problem-solving process.

Demonstrate "brainstorming" as a process to solve problems.

Define "critical thinking" and its value in the problem-solving process.

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

Demonstrate a knowledge of how social, organizational, and technological systems work.

Explore methods used to monitor and correct performance of technological systems.

Design and implement an optimal solution to a given problem.

Outline major historical technological developments or events.

Identify recent advances in technology.

Explain problem-solving roles of technology.

Forecast a technological development or event.

Define technology.

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display a knowledge of the efficient use of human resources.

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

Describe individual strengths and weaknesses.

Discuss individual interests related to a career.

Identify careers within specific areas of technology.

Explore careers within specific areas of interest.

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

Conduct a job search.

Secure information about a career.

Identify documents that may be required when applying for a job interview.

Complete a job application form correctly.

Demonstrate competence in job interview techniques.

Prepare a resume for a job.

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

Define entrepreneurship.

Describe the importance of entrepreneurship to the American economy.

List the advantages and disadvantages of business ownership.

Identify the risks involved in ownership of a business.

Identify the necessary personal characteristics of a successful entrepreneur.

Identify the business skills needed to operate a small business efficiently and effectively.

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

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

Review tentative occupational choices based on the information learned and interest developed in this course.

APPLY ADVANCED TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTION TECHNOLOGY--The student will be able to:

Apply advanced technical knowledge and skills about student performance standards 14.01 through 21.02.

Apply advanced technical knowledge and skills in the construction of a structure.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT SELECTING AND PREPARING A CONSTRUCTION SITE--The student will be able to:

Explain the steps and processes for identifying, negotiating, selecting, and acquiring sites for construction.

Explain and perform the elementary technical skills for surveying or mapping a construction site.

Describe the tools, equipment, and technical skills required for excavating a construction site.

Explain the load bearing importance of the earth and the reason for soils testing at a construction site.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT DESIGNING AND ENGINEERING CONSTRUCTED WORKS--The student will be able to:

Read and interpret architectural drawings, blueprints, symbols, and construction plans.

Describe building codes, permits, and inspection requirements.

Sketch or draw a plan for a construction project.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONTRACTING, ESTIMATING, BIDDING, AND SCHEDULING--The student will be able to:

Estimate construction costs using various methods including a computer.

Read and prepare bid invitations for contractors to build a construction project.

Establish criteria for awarding a construction contract.

Describe the content of a construction contract and performance bond.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTING SUBSTRUCTURES--The student will be able to:

Describe the types, parts, and purposes of foundations.

Describe the tools, materials, and processes for setting foundations.
Mix, place, and finish concrete for a floor, wall, or footing.
Perform the masonry technical skills of laying brick or block.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTING SUPERSTRUCTURES--The student will be able to:

Describe mass, solid wall, frame, and air-supported superstructures.
Describe the materials used in the construction of superstructures.
Use technical carpentry skills, tools, and materials in constructing a wood frame superstructure.
Use technical construction skills in building a steel or concrete frame superstructure.
Describe factory manufacturing of superstructures and modules.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INSTALLING UTILITIES--The student will be able to:

Describe public utility systems for supplying water, electricity, natural gas, and sewerage.
Describe the functions and operation of heating, cooling, and ventilating systems.
Demonstrate a technical knowledge of plumbing and electrical systems in homes or buildings.
Use the technical tools and skills to install plumbing and electrical systems utilities.
Diagnose and troubleshoot problems with utility systems.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ENCLOSING SUPERSTRUCTURES--The student will be able to:

Describe the different types of materials and methods for constructing interior and exterior walls.
Describe the different types of materials and methods for laying floors and for building roofs.
Describe the different types of methods for constructing or installing windows and doors.
Describe the purposes, materials, and methods for insulating enclosed superstructures.
Perform the technical skills of enclosing a superstructure.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INTERIOR AND EXTERIOR FINISHING OF A CONSTRUCTED STRUCTURE--The student will be able to:

Describe the different types of materials and methods for trimming, painting, and decorating a constructed structure.

Describe the types of accessories and fixtures that are installed to finish completed construction.

Explain the materials and methods used for the finishing processes of paving and landscaping.

Participate in processes of finishing a construction project and site.

Course Title: Construction Technology III

Course Credit: 1

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

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

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.

Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at work station within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

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

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Participate as a member of a team.

Teach others new skills.

Identify skills needed to serve clients/customers.

Demonstrate leadership skills.

Describe strategies necessary for negotiating agreements.

Demonstrate the application of skills necessary to work with people of diverse backgrounds.

Form an understanding and appreciation for work after listening to or observing technology workers.

Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

Form an understanding and appreciation for the roles and work of co-workers.

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

Define terms related to computers.

Identify and describe methods of information acquisition and evaluation.

Discuss advantages and disadvantages in the application of technologies.

Produce a plan to organize and maintain information relevant to emerging technologies.

Comprehend and communicate information relevant to emerging technologies.

Demonstrate the use of computers to process information.

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

Identify and explain the main and subordinate ideas in a written work.

Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.

Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.

Distinguish fact from opinion.

Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.

Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.

Improve one's own writing by restructuring, correcting errors, and rewriting.

Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.

Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.

Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.

Compose unified and coherent correspondence, directions, descriptions, explanations and reports.

Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.

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.

Use the mathematics of:

- integers, fractions, and decimals;

- ratios, proportions, and percentages;
- roots and powers;
- algebra;
- geometry.

Make estimates and approximations, and judge the reasonableness of a result.

Use elementary concepts of probability and statistics.

Draw, read, and analyze graphs, charts, and tables.

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.

Organize and communicate the results obtained by observation and experimentation.

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).

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).

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

Describe and explain steps in the design/problem-solving process.

Propose solutions to given problems.

Design and implement the optimal solution to a given problem.

Document each step of the design/problem-solving process.

Demonstrate "brainstorming" as a process to solve problems.

Define "critical thinking" and its value in the problem-solving process.

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

Demonstrate a knowledge of how social, organizational, and technological systems work.

Explore methods used to monitor and correct performance of technological systems.

Design and implement an optimal solution to a given problem.

Outline major historical technological developments or events.

Identify recent advances in technology.

Explain problem-solving roles of technology.

Forecast a technological development or event.

Define technology.

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display a knowledge of the efficient use of human resources.

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

Describe individual strengths and weaknesses.

Discuss individual interests related to a career.

Identify careers within specific areas of technology.

Explore careers within specific areas of interest.

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

Conduct a job search.

Secure information about a career.

Identify documents that may be required when applying for a job interview.

Complete a job application form correctly.

Demonstrate competence in job interview techniques.

Prepare a resume for a job.

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

Define entrepreneurship.

Describe the importance of entrepreneurship to the American economy.

List the advantages and disadvantages of business ownership.

Identify the risks involved in ownership of a business.

Identify the necessary personal characteristics of a successful entrepreneur.

Identify the business skills needed to operate a small business efficiently and effectively.

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

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

Review tentative occupational choices based on the information learned and interest developed in this course.

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

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

OPERATE A COMPUTER UTILIZING A PROGRAM RELATED TO CONSTRUCTION TECHNOLOGY--The student will be able to:

- Collect or produce data on construction technology through the operation of a computer.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT REGIONAL PLANNING AND THE CONSTRUCTION OF CIVIL OR COMMUNITY STRUCTURES--The student will be able to:

- Discuss community and regional planning needs and processes for the construction of roads, parks, dams, airports, seaports, warehouses, shopping centers, factories, and skyscrapers.
- Develop a scale model of one of the above structures and give a report on the need

CONDUCT STRUCTURAL TESTS ON CONSTRUCTED STRUCTURES AND CONSTRUCTION MATERIALS--The student will be able to:

- Perform scientific and technical tests on the strength, life, and uses of structures.
- Perform scientific and technical tests on a variety of construction materials.

CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON A CONSTRUCTION MATERIAL OR PROCESS--The student will be able to:

- Identify a problem.
- State a need to research the problem.
- Form a hypothesis about the problem.
- Plan the procedures for researching the problem.
- Conduct the research following the planned procedures.
- Present the research findings in a seminar.
- State conclusions based on the research findings.

Program Title: Drafting/Illustrative Design Technology
Occupational Area: Technology Education

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 drafting and design 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 the purposes, instruments, processes, and technical skills of drafting technology. 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.

Drafting/Illustrative Design Technology I
Drafting/Illustrative Design Technology II
Drafting/Illustrative Design 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.

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 academic and 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>>.

Laboratory/classroom safety rules and procedures which include but are not limited to the safe use of appropriate tools, operation of equipment and fire prevention precautions must be understood and followed at all times.

The student should demonstrate an understanding of prior grade specific knowledge covered in the national Standards for Technological Literacy* (STL) and the Florida Sunshine State Standards. Benchmarks followed by a reference code indicate alignment with one or both of these documents.

* Standards for Technological Literacy: Content for the Study of Technology.
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VA.

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

TECHNOLOGICAL LITERACY STANDARDS

Demonstrate an understanding of the characteristics and scope of technology.

Demonstrate an understanding of the core concepts of technology.

Demonstrate an understanding of the relationships among technologies and the connection between technology and other fields of study.

04.0 Demonstrate an understanding of the cultural, social, economic, and political effects of technology.

Demonstrate an understanding of the influence of technology on history.

Demonstrate an understanding of the attributes of design.

Demonstrate an understanding of engineering design.

Demonstrate an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Demonstrate abilities to apply the design process.

Demonstrate the abilities to use and maintain technological products and systems.

Demonstrate the abilities to assess the impact of products and systems.

Demonstrate an understanding of and be able to select and use information and communication technologies.

Demonstrate an understanding of and be able to select and use manufacturing technologies.

Demonstrate an understanding of and be able to select and use construction technologies.

TECHNICAL CONTENT STANDARDS

Demonstrate technical knowledge and skills about the use and care of drafting instruments, equipment, and materials.

Demonstrate technical skills and applications common to all types of drafting.

Demonstrate technical knowledge and skills for making basic orthographic drawings.

Demonstrate technical knowledge and skills for making pictorial drawings.

Demonstrate technical knowledge and skills for making auxiliary view drawings.

Demonstrate technical knowledge and skills for making sectional view drawings.

Demonstrate technical knowledge and skills for making working drawings.

Demonstrate technical knowledge and skills for making a basic residential drawing.

Demonstrate technical knowledge and skills for making architectural drawings to industry standards.

Demonstrate technical knowledge and skills for making a reverse engineered drawing (as built) from a solid object.

Demonstrate technical knowledge and skills for making technical illustrations.

Demonstrate technical knowledge and skills for making engineering drawings.

Demonstrate and present a research and design project.

Demonstrate an understanding of career opportunities and requirements in the field of drafting/illustrative design technology.

Course Title: Drafting/Illustrative Design Technology I

Course Credit: 1

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

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY--The student will be able to:

Discuss the nature and development of technological knowledge and processes.

STL.1.J, LA.B.2.4, LA.C.3.4, SC.H.3.4

Conduct specific goal-directed research related to inventions and innovations.

STL.1.L, LA.A.2.4, LA.B.2.4

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY--The student will be able to:

Identify systems thinking logic and creativity with appropriate compromises in complex real-life problems. STL.2.W

Define technological systems as the building blocks of technology, embedded within larger technological, social, and environmental systems. STL.2.X, LA.D.2.4

Identify resources involving trade-offs between competing values, such as availability, cost, desirability, and waste. STL.2.Z

Identify the criteria and constraints of a product or system and determine how they affect the final design and development. STL.2.AA, MA.A.5.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.3.4, SC.H.1.4

Define a management system as the process of planning, organizing, and controlling work. STL.2.EE, LA.B.2.4

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTIONS BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY--The student will be able to:

Identify technology transfer occurring when a new user applies an existing innovation developed for one purpose in a different function. STL.3.G, SC.H.3.4

Identify technological innovation resulting when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields. STL.3.H, SC.H.3.4

Identify technological progresses that promote the advancement of science and mathematics. STL.3.J, LA.A.1.4, LA.B.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY--The student will

be able to:

Identify changes caused by the use of technology ranging from gradual to rapid and from subtle to obvious. STL.4.H

Classify the use of technology involving weighing the trade-offs between the positive and negative effects. STL.4.I, LA.B.2.4

List the cultural, social, economic, and political changes caused by the transfer of a technology from one society to another. STL 4.K, LA.B.2.4, LA.E.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY--The student will be able to:

Research how the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials. STL.7.H, LA.A.1.4, LA.A.2.4, LA.B.2.4, SC.H.3.4, SS.A.2.4

Define the history of technology as a powerful force in reshaping the social, cultural, political, and economic landscape. STL.7.I, LA.D.2.4, SS.A.2.4

Define the Industrial Revolution and the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time. STL.7.N, SS.A.5.4

Define the Information Age and its placement of emphasis on the processing and exchange of information. STL.7.O

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN--

The student will be able to:

Recognize the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results. STL.8.H

Restate design problems that are seldom presented in a clearly defined form. STL.8.I, LA.D.1.4, LA.D.2.4

Check and critique a design continually, and improve and revise the idea of the design as needed. STL.8.J, SC.H.1.4

List competing requirements of a design, such as criteria, constraints, and efficiency. STL.8.K, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4

DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN--The

student will be able to:

Identify design principles used to evaluate existing designs, to collect data, and to guide the design process. STL.9.I

Describe the influence of personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly on the engineering design process. STL.9.J, LA.D.1.4, SC.H.1.4

Construct a prototype or working model used to test a design concept by making actual observations and necessary adjustments. STL.9.K, MA.B.1.4, SC.H.1.4, SC.H.3.4

Identify factors taken into account in the process of engineering design. STL.9.L, MA.A.2.4, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.E.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING--The

student will be able to:

Define research and development as a specific problem-solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace. STL.10.I

Identify research needed to solve technological problems. STL.10.J, LA.A.1.4, LA.A.2.4

Differentiate between technological and non-technological problems, and identify which problems can be solved using technology. STL.10.K, SC.H.1.4

Utilize a multidisciplinary approach to solving technological problems. STL.10.L, MA.A.1.4, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.1.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE ABILITIES TO APPLY THE DESIGN PROCESS--The student will be able to:

Identify the design problem to solve and decide whether or not to address it. STL.11.M, SC.H.1.4

Identify criteria and constraints and determine how these will affect the design process. STL.11.N, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4, SC.H.1.4, SC.H.3.4

Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product. STL.11.O, MA.B.1.4, MA.B.4.4

Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and

to note areas where improvements are needed. STL.11.P, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, SC.H.1.4, SC.H.3.4

Develop and produce a product or system using a design process. STL.11.Q
Evaluate final solutions and communicate observation, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models. STL.11.R, LA.B.2.4, LA.C.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS--The student will be able to:

Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques. STL.12.L, LA.B.2.4, LA.B.1.4, LA.C.3.4

Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it. STL.12.M

Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision. STL.12.N

Operate systems so that they function in the way they were designed. STL.12.O

Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate. STL.12.P, LA.A.2.4, MA.E.1.4

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS--The student will be able to:

Collect information and evaluate its quality. STL.13.J, LA.A.2.4, SC.H.1.4

Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and environment. STL.13.K, LA.A.2.4, SC.G.1.4, SC.G.2.4, SC.H.1.4

Use assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology. STL.13.L, LA.A.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4

Design forecasting techniques to evaluate the results of altering natural systems. STL.13.M, MA.E.3.4, SC.G.2.4

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE INFORMATION AND COMMUNICATION TECHNOLOGIES--Students

will be able to:

Discuss information and communications technologies including inputs, processes, and outputs associated with sending and receiving information. STL.17.L

Classify information and communications systems that allow information to be transferred human to human, human to machine, machine to human, and machine to machine. STL.17.M

Use information and communication systems to inform, persuade, entertain, control, manage, and educate. STL.17.N, LA.B.1.4, LA.B.2.4, LA.C.1.4, LA.C.2.4, LA.C.3.4

Identify many ways to communicate information, such as graphic and electronics means. STL.17.P, LA.C.3.4

Communicate technological knowledge and processes using symbols, measurement, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli. STL.17.Q, LA.C.3.4, MA.A.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES--The student will be able to:

Service products to keep them in good operating condition. STL.19.L

Discuss the interchangeability of parts to increase the effectiveness of manufacturing processes. STL.19.P, MA.B.4.4

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT THE USE AND CARE OF DRAFTING INSTRUMENTS, EQUIPMENT, AND MATERIALS--

The student will be able to:

Identify and demonstrate technical knowledge and skills about the use and care of drafting instruments and equipment. MA.B.2.4, MA.B.4.4

Demonstrate technical knowledge and skills about the properties, specifications, and use of drafting materials and supplies. MA.B.1.4, MA.B.4.4, MA.C.1.4

DEMONSTRATE TECHNICAL SKILLS AND APPLICATIONS COMMON TO ALL TYPES OF DRAFTING--The student will be able to:

Apply lettering techniques. LA.B.1.4, LA.B.2.4, MA.A.1.4

Make freehand sketches. MA.A.4.4

Use drafting symbols and alphabet of lines in accordance with technical standards and practices. MA.B.4.4

Apply measuring techniques. MA.B.1.4, MA.B.2.4, SC.E.2.4

Apply industry standard dimensioning techniques. MA.B.1.4, MA.B.4.4

Apply geometric construction techniques. MA.C.1.4, MA.C.3.4

Interpret information from drawings, prints, and sketches. MA.E.1.4

Apply coordinate systems. MA.C.3.4

Produce and reproduce drawings using modern technical methods for drafting reproduction.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING BASIC ORTHOGRAPHIC DRAWINGS--The student will be able to:

Explain the theory of orthographic projection. MA.C.2.4

Identify the six principal views of an object. MA.C.2.4

Produce a three-view orthographic drawing. MA.C.2.4

Produce a CAD three-view orthographic drawing. MA.C.2.4

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING PICTORIAL DRAWINGS--The student will be able to:

Explain methods of pictorial drawing.

Produce an isometric drawing. MA.C.2.4

Produce a CAD isometric drawing. MA.C.3.4

Produce an oblique drawing. MA.C.3.4

Produce a CAD oblique drawing. MA.C.2.4

Produce a perspective drawing. MA.C.2.4, MA.C.3.4

Produce a CAD perspective drawing. MA.C.2.4, MA.C.3.4

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING AUXILIARY VIEW DRAWINGS--The student will be able to:

Explain terminology and concepts associated with auxiliary view drawings.
MA.C.2.4, LA.A.1.4

Produce an auxiliary view drawing. MA.C.2.4

Produce a CAD auxiliary view drawing. MA.C.2.4

Develop a pattern using surface development techniques. MA.C.2.4

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING SECTIONAL VIEW DRAWINGS--The student will be able to:

Define sectional view and types of sectional views. LA.A.1.4, MA.C.2.4

Illustrate the types of breaks and symbols used in drawing sectional views.

Produce a sectional view drawing. MA.B.4.4, MA.C.2.4

Produce a CAD sectional view drawing. MA.B.4.4, MA.C.2.4

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING WORKING DRAWINGS--The student will be able to:

Produce detailed machine drawings. MA.B.1.4, MA.B.4.4

Produce detailed assembly drawings. MA.B.1.4, MA.B.4.4

Produce a technical illustration. MA.B.1.4, MA.B.4.4

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING A BASIC RESIDENTIAL DRAWING--The student will be able to:

Produce a dimensioned floor plan. MA.B.1.4, MA.B.2.4, MA.B.4.4

Produce dimensioned elevation drawings. MA.B.1.4, MA.B.2.4, MA.B.4.4

Course Title: Drafting/Illustrative Design Technology II

Course Credit: 1

COURSE DESCRIPTION: This course provides students with an intermediate understanding of the knowledge, human relations, and technical skills of drafting and design technology.

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY--The student will be able to:

Illustrate the nature and development of technological knowledge and processes.

STL.1.J, SC.H.3.4

Explain the rapid increase in the rate of technological development and diffusion.

STL.1.K, LA.C.3.4

Conduct specific goal-directed research related to inventions and innovations.

STL.1.L, LA.A.2.4, LA.B.2.4

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY--The student will be able to:

Apply systems thinking logic and creativity with appropriate compromises in complex real-life problems. STL.2.W

Discuss technological systems, which are the building blocks of technology and are embedded within larger technological, social, and environmental systems.

STL.2.X, LA.D.2.4

Select resources involving trade-offs between competing values, such as availability, cost, desirability, and waste. STL.2.Z

Identify the criteria and constraints of a product or system and determine how they affect the final design and development. STL.2.AA, MA.A.5.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.3.4, SC.H.1.4

Utilize optimization as an ongoing process or methodology of designing or making a product dependent on criteria and constraints. STL.2.BB

Identify new technologies that create new processes. STL.2.CC

Implement a quality control process to ensure that a product, service, or system meets established criteria. STL.2.DD

Organize a management system as the process of planning, organizing, and controlling work. STL.2.EE, LA.B.2.4

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTIONS BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY--The student will be able to:

Discuss technology transfer occurring when a new user applies an existing innovation developed for one purpose in a different function. STL.3.G, SC.H.3.4
Explain technological innovation resulting when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields. STL.3.H, SC.H.3.4

Discuss technological progresses that promote the advancement of science and mathematics. STL.3.J, LA.C.3.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY--The student will be able to:

Discuss changes caused by the use of technology ranging from gradual to rapid and from subtle to obvious. STL.4.H

Compare the use of technology involving weighing the trade-offs between the positive and negative effects. STL.4.I

Debate the cultural, social, economic, and political changes caused by the transfer of technology from one society to another. STL.4.K, LA.C.3.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY--The student will be able to:

Discuss how technological development has been evolutionary, the result of a series of refinements to a basic invention. STL.7.G

Discuss how the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials. STL.7.H, SC.H.3.4, SS.A.2.4

Research the history of technology as a powerful force in reshaping the social, cultural, political, and economic landscape. STL.7.I, LA.A.1.4, LA.A.2.4, SS.A.2.4

Discuss that early in the history of technology, the development of many tools and machines was based not on scientific knowledge but on technological know-how. STL.7.J

Define the Iron Age by the use of iron and steel as the primary materials for tools. STL.7.K

Define the Middle Ages by the development of many technological devices that produced long-lasting effects on technology and society. STL.7.L

Define the Renaissance, a time of rebirth of the arts and humanities, as an important development in the history of technology. STL.7.M

Define the Industrial Revolution as the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time. STL.7.N, SS.A.5.4

Define the Information Age and its placement of emphasis on the processing and exchange of information. STL.7.O

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN--

The student will be able to:

Describe the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results. STL.8.H

Translate design problems that are seldom presented in a clearly defined form. STL.8.I, LA.D.1.4, LA.D.2.4

Check and critique a design continually, and improve and revise the idea of the design as needed. STL.8.J, SC.H.1.4

Analyze competing requirements of a design, such as criteria, constraints, and efficiency. STL.8.K, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4

DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN--The student will be able to:

Investigate design principles used to evaluate existing designs, to collect data, and to guide the design process. STL.9.I

Examine the influence of personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly on the engineering design process. STL.9.J, LA.D.2.4, SC.H.1.4

Construct a prototype or working model to test a design concept by making actual observations and necessary adjustments. STL.9.K, MA.B.1.4, SC.H.1.4, SC.H.3.4

Evaluate factors taken into account in the process of engineering design. STL.9.L, MA.A.2.4, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.E.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING--The student will be able to:

Employ research and development as a specific problem solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace. STL.10.I

Conduct research needed to solve technological problems. STL.10.J, LA.A.1.4, LA.A.2.4

Differentiate between technological and non-technological problems, and identify which problems can be solved using technology. STL.10.K, SC.H.1.4

Utilize a multidisciplinary approach to solving technological problems. STL.10.L, SC.H.1.4, MA.A.1.4, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.1.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE ABILITIES TO APPLY THE DESIGN PROCESS--The student will be able to:

Identify a design problem to solve and decide whether or not to address it.

STL.11.M, SC.H.1.4

Identify criteria and constraints and determine how these will affect the design process. STL.11.N, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4, SC.H.1.4, SC.H.3.4

Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product. STL.11.O, MA.B.1.4, MA.B.4.4

Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed. STL.11.P, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

Develop and produce a product or system using a design process. STL.11.Q

Evaluate final solutions and communicate observation, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models. STL.11.R, LA.B.2.4, LA.C.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS--The student will be able to:

Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques. STL.12.L, LA.B.2.4, LA.B.1.4, LA.C.3.4

Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it. STL.12.M

Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision. STL.12.N

Operate systems so that they function in the way they were designed. STL.12.O

Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate. STL.12.P, LA.A.2.4, MA.E.1.4

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS--The student will be able to:

Collect information and evaluate its quality. STL.13.J, LA.A.2.4, SC.H.1.4

Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and environment. STL.13.K, LA.A.2.4, SC.G.1.4, SC.G.2.4, SC.H.1.4

Use assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology. STL.13.L, LA.A.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4

Design forecasting techniques to evaluate the results of altering natural systems. STL.13.M, MA.E.3.4, SC.G.2.4

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE INFORMATION AND COMMUNICATION TECHNOLOGIES—The student will be able to:

Discuss information and communications technologies including inputs, processes, and outputs associated with sending and receiving information. STL.17.L

Classify information and communications systems that allow information to be transferred human to human, human to machine, machine to human, and machine to machine. STL.17.M

Use information and communication systems to inform, persuade, entertain, control, manage, and educate. STL.17.N, LA.B.1.4, LA.B.2.4, LA.C.1.4, LA.C.2.4, LA.C.3.4

Identify many ways to communicate information, such as graphic and electronics means. STL.17.P, LA.C.3.4

Communicate technological knowledge and processes using symbols, measurement, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli. STL.17.Q, LA.C.3.4, MA.A.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES--The student will be able to:

Service products to keep them in good operating condition. STL.19.L

Discuss the interchangeability of parts to increase the effectiveness of manufacturing processes. STL.19.P, MA.B.4.4

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE CONSTRUCTION TECHNOLOGIES--The student will be able to:

Identify a variety of processes and procedures used in constructing structures. STL.20.K

Identify requirements involved in the design of structures. STL.20.L

Recommend maintenance, alterations, or renovations to improve a structure or alter its intended use. STL.20.M

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING ARCHITECTURAL DRAWINGS TO INDUSTRY STANDARDS--The student will be able to:

Produce a dimensioned floor plan showing walls, windows, doors, cabinets, stairs, appliances, fixtures, and other details. LA.A.2.4, MA.B.2.4, MA.B.4.4

Produce a dimensioned foundation plan with details. MA.B.2.4, MA.B.4.4, SC.B.1.4

Produce an architectural electrical plan. MA.B.2.4, MA.B.4.4, SC.B.1.4

Produce an architectural plumbing plan. MA.B.2.4, MA.B.4.4

Produce an architectural climate control plan (HVAC). MA.B.2.4, MA.B.4.4, SC.B.1.4

Produce a dimensioned roof plan with details. MA.B.2.4, MA.B.4.4

Produce a detailed information sheet including wall section and schedules. MA.C.2.4, SC.B.1.4

Produce a dimensioned plot plan. MA.B.2.4, MA.B.4.4, SC.D.1.4, SC.D.2.4, SC.G.2.4

Produce dimensioned elevation drawings showing grade lines, floors, ceilings, windows, doors, and other details. MA.B.2.4, MA.B.4.4, SC.B.1.4

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING A REVERSE ENGINEERED DRAWING (AS BUILT) FROM A SOLID OBJECT--The student will be able to:

Identify and apply advanced measuring tools and techniques. MA.B.4.4, SC.E.2.4

Apply precision dimensioning standards. MA.B.2.4, SC.A.1.4

Produce a detailed multi view orthographic drawing. MA.C.2.4, MA.C.3.4

Produce an enhanced pictorial drawing. MA.B.1.4, MA.B.2.4, MA.C.2.4, MA.D.1.4

Produce an auxiliary view drawing. MA.C.2.4

Produce a section view drawing. MA.C.2.4, MA.B.4.4

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING TECHNICAL ILLUSTRATIONS--The student will be able to:

Produce a colored or shaded pictorial rendering for presentation. MA.B.1.4, MA.B.2.4, MA.C.2.4, MA.D.1.4, LA.C.3.4

Produce a labeled graph or chart for display. MA.E.1.4, LA.C.3.4

Course Title: Drafting/Illustrative Design Technology III

Course Credit: 1

COURSE DESCRIPTION: This course provides students with advanced understanding of the knowledge, human relations and technical skills of drafting and design technology.

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY--The student will be able to:

Illustrate the nature and development of technological knowledge and processes.

STL.1.J, SC.H.3.4

Graph the rapid increase in rate of technological development and diffusion.

STL.1.K

Conduct specific goal-directed research related to inventions and innovations.

STL.1.L, LA.A.2.4, LA.B.2.4

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY--The student will be able to:

Apply systems thinking logic and creativity with appropriate compromises in complex real-life problems. STL.2.W

Assess technological systems, which are the building blocks of technology and are embedded within larger technological, social, and environmental systems. STL.2.X

Compare resources involving trade-offs between competing values, such as availability, cost, desirability, and waste. STL.2.Z

Identify the criteria and constraints of a product or system and determine how they affect the final design and development. STL.2.AA, MA.A.5.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.3.4, SC.H.1.4

Propose strategies for optimization as an ongoing process or methodology of designing or making a product dependent on criteria and constraints. STL.2.BB

Discuss new technologies that create new processes. STL.2.CC

Recommend a quality control process to ensure that a product, service, or system meets established criteria. STL.2.DD

Organize a management system as the process of planning, organizing, and controlling work. STL.2.EE, LA.B.2.4

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTIONS BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY--The student will be able to:

Create technology transfer occurring when a new user applies an existing innovation developed for one purpose in a different function. STL.3.G, SC.H.3.4

Examine technological innovation resulting when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields. STL.3.H, SC.H.3.4

Investigate technological progresses that promote the advancement of science and mathematics. STL.3.J, LA.C.3.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY--The student will be able to:

Discuss changes caused by the use of technology ranging from gradual to rapid and from subtle to obvious. STL.4.H

Evaluate the use of technology involving weighing the trade-offs between the positive and negative effects. STL.4.I

Debate the cultural, social, economic, and political changes caused by the transfer of technology from one society to another. STL.4.K, LA.C.3.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY--The student will be able to:

Research how technological development has been evolutionary, the result of a series of refinements to a basic invention. STL.7.G

Assess how the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials. STL.7.H, SC.H.3.4, SS.A.2.4

Research the history of technology as a powerful force in reshaping the social, cultural, political, and economic landscape. STL.7.I, LA.A.1.4, LA.A.2.4, SS.A.2.4

Debate that early in the history of technology, the development of many tools and machines was based not on scientific knowledge but on technological know-how. STL.7.J

Discuss the Iron Age as the use of iron and steel as the primary materials for tools. STL.7.K

Discuss the Middle Ages as the development of many technological devices that produced long-lasting effects on technology and society. STL.7.L

Discuss the Renaissance, a time of rebirth of the arts and humanities, as an important development in the history of technology. STL.7.M

Discuss the Industrial Revolution as the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time. STL.7.N, SS.A.5.4

Discuss the Information Age and its placement of emphasis on the processing and exchange of information. STL.7.O

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN--

The student will be able to:

Implement the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results. STL.8.H

Translate design problems that are seldom presented in a clearly defined form. STL.8.I, LA.D.1.4, LA.D.2.4

Evaluate a design continually, and improve and revise the idea of the design as needed. STL.8.J, SC.H.1.4

Analyze competing requirements of a design, such as criteria, constraints, and efficiency. STL.8.K, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4

DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN--The

student will be able to:

Select design principles used to evaluate existing designs, to collect data, and to guide the design process. STL.9.I

Examine the influence of personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly on the engineering design process. STL.9.J, LA.D.2.4, SC.H.1.4

Construct a prototype or working model to test a design concept by making actual observations and necessary adjustments. STL.9.K, MA.B.1.4, SC.H.1.4, SC.H.3.4

Evaluate factors taken into account in the process of engineering design. STL.9.L, MA.A.2.4, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.E.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING--The

student will be able to:

Employ research and development as a specific problem solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace. STL.10.I

Conduct research needed to solve technological problems. STL.10.J, LA.A.1.4, LA.A.2.4

Differentiate between technological and non-technological problems, and identify which problems can be solved using technology. STL.10.K, SC.H.1.4

Utilize a multidisciplinary approach to solving technological problems. STL.10.L, SC.H.1.4, MA.A.1.4, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.1.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE ABILITIES TO APPLY THE DESIGN PROCESS--The student will be able to:

Interpret the design problem to solve and decide whether or not to address it. STL.11.M, SC.H.1.4

Evaluate criteria and constraints and determine how these will affect the design process. STL.11.N, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4, SC.H.1.4, SC.H.3.4

Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product. STL.11.O, MA.B.1.4, MA.B.4.4

Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed. STL.11.P, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

Produce a product or system using a design process. STL.11.Q

Evaluate final solutions and communicate observation, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models. STL.11.R, LA.B.2.4, LA.C.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN

TECHNOLOGICAL PRODUCTS AND SYSTEMS--The student will be able to:

Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques. STL.12.L, LA.B.2.4, LA.B.1.4, LA.C.3.4

Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it. STL.12.M

Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision. STL.12.N

Operate systems so that they function in the way they were designed. STL.12.O

Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate. STL.12.P, LA.A.2.4, MA.E.1.4

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS

AND SYSTEMS--The student will be able to:

Collect information and evaluate its quality. STL.13.J, LA.A.2.4, SC.H.1.4

Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and environment. STL.13.K, LA.A.2.4, SC.G.1.4, SC.G.2.4, SC.H.1.4

Apply assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology. STL.13.L, LA.A.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4

Design forecasting techniques to evaluate the results of altering natural systems. STL.13.M, MA.E.3.4, SC.G.2.4

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE INFORMATION AND COMMUNICATION TECHNOLOGIES--The student will be able to:

Discuss information and communications technologies including inputs, processes, and outputs associated with sending and receiving information. STL.17.L

Classify information and communications systems that allow information to be transferred human to human, human to machine, machine to human, and machine to machine. STL.17.M

Use information and communication systems to inform, persuade, entertain, control, manage, and educate. STL.17.N, LA.B.1.4, LA.B.2.4, LA.C.1.4, LA.C.2.4, LA.C.3.4

Identify many ways to communicate information, such as graphic and electronics means. STL.17.P, LA.C.3.4

Communicate technological knowledge and processes using symbols, measurement, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli. STL.17.Q, LA.C.3.4, MA.A.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES--The student will be able to:

Service products to keep them in good operating condition. STL.19.L

Discuss the interchangeability of parts to increase the effectiveness of manufacturing processes. STL.19.P, MA.B.4.4

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING ENGINEERING DRAWINGS--The student will be able to:

Produce an advanced detailed machine drawing with tolerances, hidden surfaces and other mechanical details. LA.A.1.4, LA.A.2.4, MA.B.1.4, MA.B.4.4, SC.A.1.4, SC.E.2.4

Produce detailed electrical and electronic schematics with appropriate components. LA.A.1.4, LA.A.2.4, MA.B.1.4, MA.B.4.4, SC.B.1.4, SC.E.2.4
Produce a contour map with a cut and fill drawing annotated in accordance with government codes. SS.B.1.4, LA.A.1.4, LA.A.2.4, MA.B.1.4, MA.B.4.4, SC.D.1.4, SC.E.2.4, SC.G.2.4

DEMONSTRATE AND PRESENT A RESEARCH AND DESIGN PROJECT--The student will be able to:

Identify and research a design problem related to one of the following technologies (medical, GIS, agriculture, energy & power, information & communication, transportation, manufacturing, and construction). LA.A.1.4, LA.A.2.4, SC.A.1.4, SC.D.2.4, SC.E.2.4, SC.H.1.4, SC.H.3.4
Identify criteria and constraints. LA.A.1.4, SC.H.3.4
Produce a virtual or physical model of the solution. MA.B.4.4, SC.E.2.4, SC.H.3.4
Test and evaluate the solution. MA.E.3.4, SC.H.1.4, SC.H.3.4
Deliver a professional quality presentation of the design process and solution (i.e., a rendering, walk-through, fly-over, or animation of a design). LA.A.1.4, LA.A.2.4, LA.C.3.4

DEMONSTRATE AN UNDERSTANDING OF CAREER OPPORTUNITIES AND REQUIREMENTS IN THE FIELD OF DRAFTING/ILLUSTRATIVE DESIGN TECHNOLOGY--The student will be able to:

Discuss individual interests related to a career in drafting/illustrative design technology. LA.B.2.4
Explore career opportunities related to a career in drafting/illustrative design technology. LA.A.1.4, LA.A.2.4, LA.B.2.4
Explore secondary education opportunities related to drafting/illustrative design technology. LA.A.1.4, LA.A.2.4, LA.B.2.4
Conduct a job search. LA.A.1.4, LA.A.2.4
Complete a job application form correctly. LA.B.2.4
Demonstrate competence in job interview techniques. LA.C.1.4, LA.C.3.4, LA.D.1.4
Create a professional resume and letter of introduction. LA.A.1.4, LA.A.2.4, LA.B.1.4, LA.B.2.4
Solicit awards, letters of recommendation and recognition. LA.A.1.4, LA.A.2.4, LA.C.3.4, LA.D.1.4
Organize work samples in a professional, presentable format. LA.B.2.4, LA.C.3.4, LA.D.1.4

Program Title: **Electronics Technology**
Occupational Area: Technology Education

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 electronics 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, the theory, use, and technical application of electronics technology. 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.

Electronics Technology I
Electronics Technology II
Electronics 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.

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>>.

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

Demonstrate the ability to work safely with a variety of technologies.
Demonstrate interpersonal skills as they relate to the workplace.
Identify and apply methods of information acquisition and utilization.
Apply basic skills in communications, mathematics, and science appropriate to technological content and learning activities.

Demonstrate and apply design/problem-solving processes.
Express an understanding of technological systems and their complex interrelationships.
Demonstrate the ability to properly identify, organize, plan, and allocate resources.
Discuss individual interests and aptitudes as they relate to a career.
Demonstrate employability skills.
Demonstrate an understanding of entrepreneurship.
Make an informed and meaningful career choice.
Describe the structure of matter related to electronics.
Describe, construct, conduct, and analyze experiments with basic DC and AC circuits and with circuits using magnetism.
Identify, measure, and describe the function of transformers and inductors in electronic circuits.
Use Ohm's law and Watt's law to analyze and experiment with resistive circuits.
Describe, construct, analyze, and experiment with capacitive circuits.
Demonstrate the use of electronic equipment.
Demonstrate proper electronic assembly methods.
Demonstrate an understanding of basic electrical circuits and electronic systems.
Describe the structure of matter related to electronics.
Describe, construct, conduct, and analyze experiments with basic DC and AC circuits and with circuits using magnetism.
Identify, measure, and describe the function of transformers and inductors in electronic circuits.
Use Ohm's law and Watt's law to analyze and experiment with resistive circuits.
Describe, construct, analyze, and experiment with capacitive circuits
Describe and experiment with integrated circuits.
Demonstrate the use of electronic equipment.
Demonstrate an understanding of basic electrical circuits and electronic systems.
Describe, conduct, and experiment with circuits using semiconductors.
Perform advanced study and skills related to electronics technology.
Demonstrate an understanding of the principles and applications of microcomputer systems.
Describe, identify, and correct problems in electronic circuits.
Demonstrate technical knowledge and skills about electronic networks and systems.
Conduct a research and experimentation project on an electronic system or process.

Course Title: **Electronics Technology I**

Course Credit: 1

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

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

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.

Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at work station within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

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

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Participate as a member of a team.

Teach others new skills.

Identify skills needed to serve clients/customers.

Demonstrate leadership skills.

Describe strategies necessary for negotiating agreements.

Demonstrate the application of skills necessary to work with people of diverse backgrounds.

Form an understanding and appreciation for work after listening to or observing technology workers.

Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

Form an understanding and appreciation for the roles and work of co-workers.

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

Define terms related to computers.

Identify and describe methods of information acquisition and evaluation.

Discuss advantages and disadvantages in the application of technologies.

Produce a plan to organize and maintain information relevant to emerging technologies.

Comprehend and communicate information relevant to emerging technologies.

Demonstrate the use of computers to process information.

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

Identify and explain the main and subordinate ideas in a written work.

Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.

Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.

Distinguish fact from opinion.

Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.

Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.

Improve one's own writing by restructuring, correcting errors, and rewriting.

Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.

Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.

Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.

Compose unified and coherent correspondence, directions, descriptions, explanations and reports.

Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.

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.

Use the mathematics of:

- integers, fractions, and decimals;

- ratios, proportions, and percentages;
- roots and powers;
- algebra;
- geometry.

Make estimates and approximations, and judge the reasonableness of a result.

Use elementary concepts of probability and statistics.

Draw, read, and analyze graphs, charts, and tables.

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.

Organize and communicate the results obtained by observation and experimentation.

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).

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).

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

Describe and explain steps in the design/problem-solving process.

Propose solutions to given problems.

Design and implement the optimal solution to a given problem.

Document each step of the design/problem-solving process.

Demonstrate "brainstorming" as a process to solve problems.

Define "critical thinking" and its value in the problem-solving process.

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

Demonstrate a knowledge of how social, organizational, and technological systems work.

Explore methods used to monitor and correct performance of technological systems.

Design and implement an optimal solution to a given problem.

Outline major historical technological developments or events.

Identify recent advances in technology.

Explain problem-solving roles of technology.

Forecast a technological development or event.

Define technology.

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display a knowledge of the efficient use of human resources.

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

Describe individual strengths and weaknesses.

Discuss individual interests related to a career.

Identify careers within specific areas of technology.

Explore careers within specific areas of interest.

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

Conduct a job search.

Secure information about a career.

Identify documents that may be required when applying for a job interview.

Complete a job application form correctly.

Demonstrate competence in job interview techniques.

Prepare a resume for a job.

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

Define entrepreneurship.

Describe the importance of entrepreneurship to the American economy.

List the advantages and disadvantages of business ownership.

Identify the risks involved in ownership of a business.

Identify the necessary personal characteristics of a successful entrepreneur.

Identify the business skills needed to operate a small business efficiently and effectively.

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

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

Review tentative occupational choices based on the information learned and interest developed in this course.

DESCRIBE THE STRUCTURE OF MATTER RELATED TO ELECTRONICS--The student will be able to:

Describe the composition of elements, mixtures, and compounds according to the electron theory.

List the atomic subparticles.

Diagram and show the relationship between electrons, protons, and neutrons.

State the law of electrical charges.

Describe the classification and characteristics of materials as they apply to conductor, insulators, and semiconductors.

Demonstrate proficiency in the identification of electronics symbols.

DESCRIBE, CONSTRUCT, CONDUCT, AND ANALYZE EXPERIMENTS WITH BASIC DC AND AC CIRCUITS AND WITH CIRCUITS USING MAGNETISM--

The student will be able to:

Solve math problems related to DC and AC circuits.

Define voltage, current, resistance, power, and energy.

Set up and test basic circuits.

Set up and operate multimeters in DC and AC circuits.

Set up and operate power supplies in DC circuits.

Describe magnetism, the law of magnetic poles, and the behavior of flux lines.

Demonstrate electromagnetism.

Construct simple circuits using a relay.

IDENTIFY, MEASURE, AND DESCRIBE THE FUNCTION OF TRANSFORMERS AND INDUCTORS IN ELECTRONIC CIRCUITS--The student will be able to:

Explain the theory of operation and application of inductance in inductors and transformers.

Explain what an inductor is and what its purpose is.

Construct circuits using transformers and inductors.

Explain inductive reactance.

USE OHM'S LAW AND WATT'S LAW TO ANALYZE AND EXPERIMENT WITH RESISTIVE CIRCUITS--The student will be able to:

Identify resistors by color code.

Identify and measure resistors.

Apply Ohm's law to circuits.

Explain how resistors are constructed.

Apply Watt's law to circuits.

Use a VOM to verify values.

Identify different types of resistors, and explain their use and ratings.

DESCRIBE, CONSTRUCT, ANALYZE AND EXPERIMENT WITH CAPACITIVE CIRCUITS--The student will be able to:

Explain how a capacitor stores electrical energy.

Explain how a capacitor is constructed.

Explain capacitive reactance.

DEMONSTRATE THE USE OF ELECTRONIC EQUIPMENT--The student will be able to:

Use a VOM to obtain accurate measurements.

Apply safety rules in the use of electronic instruments and demonstrate proper care and maintenance for the equipment during storage and use.

Use voltmeters, ammeters, and ohmmeters to obtain accurate measurements.

Set up and use an oscilloscope to observe waveforms and to determine the voltage of the signal presented.

Use signal generators to produce waveforms of selected frequencies and shapes.

Use testers to determine the condition of electronic components.

DEMONSTRATE PROPER ELECTRONIC ASSEMBLY METHODS--The student will be able to:

Exhibit safe soldering techniques.

Identify proper soldering practices.

Demonstrate proper soldering applications.

Identify common electrical and electronics hand tools.

Demonstrate electronic component assembly.

Apply electrical tape to a spliced and soldered wire connection.

Solder and de-solder components and wires.

Describe the two methods of making a printed circuit board.

DEMONSTRATE AN UNDERSTANDING OF BASIC ELECTRICAL CIRCUITS AND ELECTRONIC SYSTEMS--The student will be able to:

Identify problems and demonstrate appropriate solutions when dealing with series, series-parallel, parallel, voltage dividers, and network circuits.

Define electronic systems.

Describe the importance of electronic systems in today's technology world.

Define electronics input, process and output of electronic systems.

Conduct electronic experiments using input, process and output systems.

Describe, design and conduct experiments with electronic systems.

Course Title: **Electronics Technology II**

Course Credit: 1

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

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

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.

Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at work station within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

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

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Participate as a member of a team.

Teach others new skills.

Identify skills needed to serve clients/customers.

Demonstrate leadership skills.

Describe strategies necessary for negotiating agreements.

Demonstrate the application of skills necessary to work with people of diverse backgrounds.

Form an understanding and appreciation for work after listening to or observing technology workers.

Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

Form an understanding and appreciation for the roles and work of co-workers.

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

Define terms related to computers.

Identify and describe methods of information acquisition and evaluation.

Discuss advantages and disadvantages in the application of technologies.

Produce a plan to organize and maintain information relevant to emerging technologies.

Comprehend and communicate information relevant to emerging technologies.

Demonstrate the use of computers to process information.

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

Identify and explain the main and subordinate ideas in a written work.

Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.

Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.

Distinguish fact from opinion.

Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.

Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.

Improve one's own writing by restructuring, correcting errors, and rewriting.

Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.

Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.

Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.

Compose unified and coherent correspondence, directions, descriptions, explanations and reports.

Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.

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.

Use the mathematics of:

- integers, fractions, and decimals;

- ratios, proportions, and percentages;
- roots and powers;
- algebra;
- geometry.

Make estimates and approximations, and judge the reasonableness of a result.

Use elementary concepts of probability and statistics.

Draw, read, and analyze graphs, charts, and tables.

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.

Organize and communicate the results obtained by observation and experimentation.

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).

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).

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

Describe and explain steps in the design/problem-solving process.

Propose solutions to given problems.

Design and implement the optimal solution to a given problem.

Document each step of the design/problem-solving process.

Demonstrate "brainstorming" as a process to solve problems.

Define "critical thinking" and its value in the problem-solving process.

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

Demonstrate a knowledge of how social, organizational, and technological systems work.

Explore methods used to monitor and correct performance of technological systems.

Design and implement an optimal solution to a given problem.

Outline major historical technological developments or events.

Identify recent advances in technology.

Explain problem-solving roles of technology.

Forecast a technological development or event.

Define technology.

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display a knowledge of the efficient use of human resources.

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

Describe individual strengths and weaknesses.

Discuss individual interests related to a career.

Identify careers within specific areas of technology.

Explore careers within specific areas of interest.

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

Conduct a job search.

Secure information about a career.

Identify documents that may be required when applying for a job interview.

Complete a job application form correctly.

Demonstrate competence in job interview techniques.

Prepare a resume for a job.

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

Define entrepreneurship.

Describe the importance of entrepreneurship to the American economy.

List the advantages and disadvantages of business ownership.

Identify the risks involved in ownership of a business.

Identify the necessary personal characteristics of a successful entrepreneur.

Identify the business skills needed to operate a small business efficiently and effectively.

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

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

Review tentative occupational choices based on the information learned and interest developed in this course.

DESCRIBE THE STRUCTURE OF MATTER RELATED TO ELECTRONICS--The student will be able to:

Describe the composition of element, mixtures, and compounds according to the electron theory.

List the atomic subparticles.

Diagram and show the relationship between electrons, protons, and neutrons.

State the law of electrical charges.

Describe the classification and characteristics of materials as they apply to conductors, insulators, and semiconductors.

Demonstrate proficiency in the identification of electronics symbols.

DESCRIBE, CONSTRUCT, CONDUCT, AND ANALYZE EXPERIMENTS WITH BASIC DC AND AC CIRCUITS AND WITH CIRCUITS USING MAGNETISM--

The student will be able to:

Solve electronic math problems related to DC and AC circuits.

Define voltage, current, resistance, power, and energy.

Set up and test basic circuits.

Set up and operate multimeters in DC and AC circuits.

Set up and operate power supplies in DC circuits.

Describe magnetism, the law of magnetic poles, and the behavior of flux lines.

Demonstrate electromagnetism.

Construct simple circuits using a relay.

IDENTIFY, MEASURE, AND DESCRIBE THE FUNCTION OF TRANSFORMERS AND INDUCTORS IN ELECTRONIC CIRCUITS--The student will be able to:

Explain the theory of operation and application of inductance in inductors and transformers.

Explain what an inductor is and what its purpose is.

Construct circuits using transformers and inductors.

Explain inductive reactance.

USE OHM'S LAW AND WATT'S LAW TO ANALYZE AND EXPERIMENT WITH RESISTIVE CIRCUITS--The student will be able to:

Identify resistors by color code.

Identify and measure resistors.

Apply Ohm's law to circuits.

Explain how resistors are constructed.

Apply Watt's law to circuits.

Use a VOM to verify values.

Identify different types of resistors, and explain their use ratings.

DESCRIBE, CONSTRUCT, ANALYZE AND EXPERIMENT WITH CAPACITIVE CIRCUITS--The student will be able to:

Explain how a capacitor stores electrical energy.

Explain how a capacitor is constructed.

Explain capacitive reactance.

DESCRIBE AND EXPERIMENT WITH INTEGRATED CIRCUITS--The student will be able to:

Explain what integrated circuits (IC's) are and how they are manufactured.

Explain the advantages of integrated circuits as compared to discrete component circuits.

Construct electronic circuits that contain ICs.

Describe the basic types of integrated circuit design, along with their pin numbering systems and dimensions.

DEMONSTRATE THE USE OF ELECTRONIC EQUIPMENT--The student will be able to:

Use a VOM to obtain accurate measurements.

Apply safety rules in the use of electronic instruments and demonstrate proper care and maintenance for the equipment during storage and use.

Use voltmeters, ammeters, and ohmmeters to obtain accurate measurements.

Set up and use an oscilloscope to observe waveforms and to determine the voltage of the signal presented.

Use signal generators to produce waveforms of selected frequencies and shapes.

Use testers to determine the condition of electronic components.

DEMONSTRATE AN UNDERSTANDING OF BASIC ELECTRICAL CIRCUITS AND ELECTRONIC SYSTEMS--The student will be able to:

Identify problems and demonstrate appropriate solutions when dealing with series, series-parallel, parallel, voltage dividers, and network circuits.

Define electronic systems.

Describe the importance of electronic systems in today's technology world.

Define electronic input, process and output of electronic systems.

Conduct electronic experiments using input, process and output systems.

Describe, design and conduct experiments with electronic systems.

Define and give an example of a super conductor.

DESCRIBE, CONSTRUCT, AND EXPERIMENT WITH CIRCUITS USING SEMICONDUCTORS--The student will be able to:

Describe the general theory and application of semiconductor devices.

Explain the difference between N-type and P-type material.

Explain the precautions necessary when working with solid state devices.

Demonstrate the proper procedures for the installation of solid state components using thermal release devices (heat sinks).

Construct and experiment with semiconductor devices.

Construct and test circuits which contain solid state components such as FET'S, SCR's, UJT's, tunnel diodes, zener diodes, light emitting diodes, etc.

Course Title: **Electronics Technology III**

Course Credit: 1

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

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

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.

Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at work station within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

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

Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

Participate as a member of a team.

Teach others new skills.

Identify skills needed to serve clients/customers.

Demonstrate leadership skills.

Describe strategies necessary for negotiating agreements.

Demonstrate the application of skills necessary to work with people of diverse backgrounds.

Form an understanding and appreciation for work after listening to or observing technology workers.

Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

Form an understanding and appreciation for the roles and work of co-workers.

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

Define terms related to computers.

Identify and describe methods of information acquisition and evaluation.

Discuss advantages and disadvantages in the application of technologies.

Produce a plan to organize and maintain information relevant to emerging technologies.

Comprehend and communicate information relevant to emerging technologies.

Demonstrate the use of computers to process information.

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

Identify and explain the main and subordinate ideas in a written work.

Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.

Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.

Distinguish fact from opinion.

Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.

Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.

Improve one's own writing by restructuring, correcting errors, and rewriting.

Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.

Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.

Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.

Compose unified and coherent correspondence, directions, descriptions, explanations and reports.

Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.

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.

Use the mathematics of:

- integers, fractions, and decimals;

- ratios, proportions, and percentages;
- roots and powers;
- algebra;
- geometry.

Make estimates and approximations, and judge the reasonableness of a result.

Use elementary concepts of probability and statistics.

Draw, read, and analyze graphs, charts, and tables.

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.

Organize and communicate the results obtained by observation and experimentation.

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).

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).

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

Describe and explain steps in the design/problem-solving process.

Propose solutions to given problems.

Design and implement the optimal solution to a given problem.

Document each step of the design/problem-solving process.

Demonstrate "brainstorming" as a process to solve problems.

Define "critical thinking" and its value in the problem-solving process.

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

Demonstrate a knowledge of how social, organizational, and technological systems work.

Explore methods used to monitor and correct performance of technological systems.

Design and implement an optimal solution to a given problem.

Outline major historical technological developments or events.

Identify recent advances in technology.

Explain problem-solving roles of technology.

Forecast a technological development or event.

Define technology.

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display a knowledge of the efficient use of human resources.

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

Describe individual strengths and weaknesses.

Discuss individual interests related to a career.

Identify careers within specific areas of technology.

Explore careers within specific areas of interest.

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

Conduct a job search.

Secure information about a career.

Identify documents that may be required when applying for a job interview.

Complete a job application form correctly.

Demonstrate competence in job interview techniques.

Prepare a resume for a job.

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

Define entrepreneurship.

Describe the importance of entrepreneurship to the American economy.

List the advantages and disadvantages of business ownership.

Identify the risks involved in ownership of a business.

Identify the necessary personal characteristics of a successful entrepreneur.

Identify the business skills needed to operate a small business efficiently and effectively.

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

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

Review tentative occupational choices based on the information learned and interest developed in this course.

PERFORM ADVANCED STUDY AND SKILLS RELATED TO ELECTRONICS--

The student will be able to:

Select an individual or group project in cooperation with the teacher.

Develop a written plan of work to carry out the project.

Show evidence of technical study in support of the project.

Perform skills related to the project.

Complete the project as planned.

DEMONSTRATE AN UNDERSTANDING OF THE PRINCIPLES AND APPLICATIONS OF MICROCOMPUTER SYSTEMS--The student will be able to:

Define microcomputer systems.

Describe the importance of microcomputer systems in today's technology world.

Describe microcomputer applications in today's technology world.

Define microcomputer interfacing.

Conduct microcomputer systems experiments.

Conduct microcomputer systems interfacing, sensing and control applications.

DESCRIBE, IDENTIFY, AND CORRECT PROBLEMS IN ELECTRONIC CIRCUITS--The student will be able to:

Identify problems and demonstrate solutions when dealing with power supplies, oscillators, and amplifiers.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ELECTRONIC NETWORKS AND SYSTEMS--The student will be able to:

Define and describe telecommunications.

Conduct telecommunications experiments including receivers, transmitters, wirelines and antennas, telephones and fiber optics.

Describe the technology and organization of electronic guidance systems.

Perform technical skills in building, assembling, servicing, or operating one of the above systems.

Define and describe logic control.

Conduct a logic control experiment.

Define and describe digital communications.

Conduct a digital communications experiment.

Define and describe industrial controls.

Conduct an industrial controls experiment.

CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON AN ELECTRONIC SYSTEM OR PROCESS--The student will be able to:

Identify a problem.

State a need to research the problem.

Form a hypothesis about the problem.

Plan the procedures for researching the problem.

Conduct the research following the planned procedures.

Present the research findings in a seminar.

State conclusions based on the research findings.

Program Title: Materials and Processes Technology

Occupational Area: Technology Education

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 the technology of materials and processes. 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 the pre-processing, processing, and post-processing of wood, metal, plastic, composites, and other materials. 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.

Materials and Processes Technology I
Materials and Processes Technology II
Materials and Processes 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.

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 academic and 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>>.

Laboratory/classroom safety rules and procedures which include but are not limited to the safe use of appropriate tools, operation of equipment and fire prevention precautions must be understood and followed at all times.

The student should demonstrate an understanding of prior grade specific knowledge covered in the national Standards for Technological Literacy* (STL)

and the Florida Sunshine State Standards. Benchmarks followed by a reference code indicate alignment with one or both of these documents.

* Standards for Technological Literacy: Content for the Study of Technology.
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IV. INTENDED OUTCOMES: After successfully completing this program, the student will be able to:

TECHNOLOGICAL LITERACY STANDARDS

Demonstrate an understanding of the characteristics and scope of technology.

Demonstrate an understanding of the core concepts of technology.

Demonstrate an understanding of the relationships among technologies and the connection between technology and other fields of study.

Demonstrate an understanding of the cultural, social, economic, and political effects of technology.

Demonstrate an understanding of the effects of technology on the environment.

Demonstrate an understanding of the role of society in the development and use of technology.

Demonstrate an understanding of the influence of technology on history.

Demonstrate an understanding of the attributes of design.

Demonstrate an understanding of engineering design.

Demonstrate an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Demonstrate the abilities to apply the design process.

Demonstrate the abilities to use and maintain technological products and systems.

Demonstrate the abilities to assess the impact of products and systems.

Demonstrate an understanding of and be able to select and use manufacturing technologies.

TECHNICAL CONTENT STANDARDS

Demonstrate the ability to properly identify, organize, plan, and allocate resources.

Demonstrate an understanding of entrepreneurship.

Demonstrate technical knowledge and skills associated with pre-processing activities and practices of industrial materials.

Demonstrate technical knowledge and skills associated with processing activities and practices of industrial materials.

Demonstrate technical knowledge and skills associated with post-processing activities and practices of industrial materials.

Demonstrate safe and appropriate use of tools, machines, and materials in the processing of industrial materials.

Perform advanced study and technical skills related to materials and processes.

Demonstrate understanding of career opportunities and requirements in the field of Materials and Processes Technology.

Course Title: Materials and Processes Technology I
Course Credit: 1

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

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY--The student will be able to:

Illustrate the nature and development of technological knowledge and processes.

STL.1.J, LA.B.2.4, LA.C.3.4, SC.H.3.4

Graph the rapid increase in the rate of technological development and diffusion.

STL.1.K, LA.B.2.4, LA.D.2.4, MA.B.1.4

Conduct specific, goal-directed research related to inventions and innovations.

STL.1.L, LA.A.1.4, LA.A.2.4, LA.B.2.4

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY--The student will be able to:

Apply systems thinking logic and creativity with appropriate compromises in complex real-life problems. STL.2.W

Discuss technological systems, which are the building blocks of technology, are embedded within larger technological, social, and environmental systems.

STL.2.X, LA.D.2.4

Assess the stability of a technological system and its influence by all of the components in the system, especially those in the feedback loop. STL.2.Y

Select resources involving trade-offs between competing values, such as availability, cost, desirability, and waste. STL.2.Z, SS.D.1.4

Identify the criteria and constraints of a product or system and determine how they affect the final design and development. STL.2.AA, MA.A.5.4, MA.B.1.4,

MA.B.3.4, MA.B.4.4, MA.E.3.4, SC.H.1.4

Implement strategies for optimizing a technological process or methodology of designing or making a product, dependent on criteria and constraints. STL.2.BB

Organize a management system as the process of planning, organizing, and controlling work. STL.2.EE

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTIONS BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY--The student will be able to:

Discuss technology transfer occurring when a new user applies an existing innovation developed for one purpose in a different function. STL.3.G, SC.H.3.4

Identify technological innovations resulting when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields. STL.3.H, SC.H.3.4

Outline the process of patenting to protect a technological idea. STL.3.I

Identify technological progresses that promote the advancement of science and mathematics. STL.3.J, LA.A.1.4, LA.B.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY--The student will be able to:

Compare the use of technology involving weighing the trade-offs between the positive and negative effects. STL.4.I, LA.B.2.4

Debate the cultural, social, economic, and political changes caused by the transfer of a technology from one society to another. STL.4.K, LA.B.2.4, LA.E.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT--The student will be able to:

Compare trade-offs of developing technologies to reduce the use of resources. STL.5.H, SC.G.2.4, SS.D.1.4

Assess technologies devised to reduce the negative consequences of other technologies. STL.5.K

Make decisions about the implementation of technologies involving the weighing of trade-offs between predicted positive and negative effects on the environment. STL.5.L, SC.G.2.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY--The student will be able to:

Investigate how different cultures develop their own technologies to satisfy their individual and shared needs, wants, and values. STL.6.H, LA.D.2.4, SS.B.2.4

Collect societal opinions and demands, as well as corporate cultures to use as a basis for deciding whether or not to develop a technology. STL.6.I

Identify a number of different factors, such as advertising, the strength of the economy, the goals of a company, and the latest fads as contributors to shaping the design of and demand for various technologies. STL.6.J, LA.D.2.4, SS.A.1.4, SS.D.2.4

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY--The student will be able to:

Research how the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials. STL.7.H, LA.A.1.4, LA.A.2.4, LA.B.2.4, SC.H.3.4, SS.A.2.4

Describe the history of technology as a powerful force in reshaping the social, cultural, political, and economic landscape. STL.7.I, LA.D.2.4, SS.A.2.4

Discuss that early in the history of technology, the development of many tools and machines was based not on scientific knowledge, but on technological know-how. STL.7.J, SS.A.1.4

Define the Iron Age as the use of iron and steel as the primary materials for tools. STL.7.K

Define the Middle Ages and its development of many technological devices that produced long-lasting effects on technology and society. STL.7.L, SS.A.2.4

Define the Renaissance, a time of rebirth of the arts and humanities, as an important development in the history of technology. STL.7.M, SS.A.3.4

Define the Industrial Revolution as the development of continuous manufacturing, improved education and leisure time. STL.7.N, SS.A.5.4

Define the Information Age and its placement of emphasis on the processing and exchange of information. STL.7.O, SS.A.5.4

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN--

The student will be able to:

Recognize the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results. STL.8.H

Restate design problems that are seldom presented in a clearly defined form. STL.8.I, LA.D.1.4, LA.D.2.4

Check and critique a design continually, and improve and revise the idea of the design as needed. STL.8.J, SC.H.1.4

List competing requirements of a design, such as criteria, constraints, and efficiency. STL.8.K, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4

DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN--The

student will be able to:

Identify design principles used to evaluate existing designs, to collect data, and to guide the design process. STL.9.I

Describe the influence of personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly on the engineering design process. STL.9.J, LA.D.1.4, SC.H.1.4

Construct a prototype or working model used to test a design concept by making actual observations and necessary adjustments. STL.9.K, MA.B.1.4, SC.H.1.4, SC.H.3.4

Identify factors taken into account in the process of engineering. STL.9.L

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING--The

student will be able to:

Define research and development as a specific problem-solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace. STL.10.I

Identify research needed to solve technological problems. STL.10.J, LA.A.1.4, LA.A.2.4

Differentiate between technological and non-technological problems, and identify which problems can be solved using technology. STL.10.K, SC.H.1.4

Utilize a multidisciplinary approach to solving technological problems. STL.10.L, MA.A.1.4, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.1.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE ABILITIES TO APPLY THE DESIGN PROCESS--The student will be able to:

Identify the design problem to solve and decide whether or not to address it. STL.11.M, SC.H.1.4

Identify criteria and constraints and determine how these will affect the design process. STL.11.N, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4, SC.H.1.4, SC.H.3.4

Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product. STL.11.O, SC.H.3.4

Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed. STL.11.P, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4

Develop and produce a product or system using a design process. STL.11.Q

Evaluate final solutions and communicate observation, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written

means, in addition to three-dimensional models. STL.11.R, LA.B.2.4, LA.C.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS--The student will be able to:

Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques. STL.12.L, LA.B.1.4, LA.B.2.4, LA.C.3.4

Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it. STL.12.M

Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision. STL.12.N

Operate systems so that they function in the way they were designed. STL.12.O

Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate. STL.12.P, LA.A.2.4, MA.E.1.4

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS--The student will be able to:

Collect information and evaluate its quality. STL.13.J, LA.A.2.4, SC.H.1.4

Evaluate data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and environment. STL.13.K, LA.A.2.4, SC.G.1.4, SC.G.2.4, SC.H.1.4

Use assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology. STL.13.L, LA.A.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4

Identify forecasting techniques to evaluate the results of altering natural systems. STL.13.M, MA.E.3.4, SC.G.2.4

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES--The student will be able to:

Service products to keep them in good operating condition. STL.19.L

Classify materials based on their qualities as natural, synthetic, or mixed. STL.19.M

Classify goods as durable goods designed to operator for a long period of time, or non-durable goods designed to operate for a short period of time. STL.19.N

Identify and classify manufacturing systems into types, such as customized production, batch production, and continuous production. STL.19.O

Discuss the interchangeability of parts to increase the effectiveness of manufacturing processes. STL.19.P

Identify chemical technologies providing a means for humans to alter or modify materials and to produce chemical products. STL.19.Q

Employ marketing techniques involving establishing a product's identity, conducting research on its potential, advertising it, distributing it, and selling it. STL.19.R

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives. MA.B.3.4, MA.E.1.4

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display knowledge of the efficient use of human resources.

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

Define entrepreneurship.

Describe the importance of entrepreneurship to the American economy. SS.D.2.4

List the advantages and disadvantages of business ownership.

Identify the risks involved in ownership of a business.

Identify the necessary personal characteristics of a successful entrepreneur.

Identify the business skills needed to operate a small business efficiently and effectively.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ASSOCIATED WITH PRE-PROCESSING ACTIVITIES AND PRACTICES OF INDUSTRIAL MATERIALS--The student will be able to:

Define and describe the term "pre-processing" as it relates to industrial materials.

Describe the technical processes of extracting materials from natural resources.

Locate and order industrial materials.

Arrange for the appropriate transportation of industrial materials.

Store and protect industrial materials properly.

Follow proper precautions in the receiving, unpacking, and handling of industrial materials.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ASSOCIATED WITH PROCESSING ACTIVITIES AND PRACTICES OF INDUSTRIAL MATERIALS--The student will be able to:

Define and describe “processing” as it relates to industrial materials.
Demonstrate technical processing of a variety of industrial materials, such as wood, metals, and plastic.
Apply the technical processes of separating and forming using a variety of industrial materials.
Apply the technical processes of conditioning a variety of industrial materials.
Apply the technical processes of combining in the fabrication and finishing of a product.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ASSOCIATED WITH POST-PROCESSING ACTIVITIES AND PRACTICES OF INDUSTRIAL MATERIALS--The student will be able to:

Define and describe “post-processing” as it relates to industrial materials.
Identify processes for distributing products made of industrial materials.
Describe processes for installing products made of industrial materials.
Describe processes for maintaining products made of industrial materials.
Describe processes for altering products made of industrial materials.
Describe processes for servicing products made of industrial materials.

DEMONSTRATE SAFE AND APPROPRIATE USE OF TOOLS AND MACHINES IN THE PROCESSING OF INDUSTRIAL MATERIALS--The student will be able to:

Select appropriate tools, procedures, and/or equipment needed to produce a product.
Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
Maintain and troubleshoot equipment used in a variety of technological systems.
Follow laboratory safety rules and procedures.
Demonstrate good housekeeping at workstation within total laboratory.
Identify color-coding safety standards.
Explain fire prevention and safety precautions and practices for extinguishing fires.
Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

Course Title: Materials and Processes Technology II

Course Credit: 1

COURSE DESCRIPTION: This course provides students with an intermediate understanding of the knowledge, human relations, and technical skills of industrial materials and processes technology.

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY--The student will be able to:

Discuss the nature and development of technological knowledge and processes.

STL.1.J, LA.B.2.4, LA.C.3.4, SC.H.3.4

Explain the rapid increase in the rate of technological development and diffusion.

STL.1.K, LA.B.2.4, LA.D.2.4, MA.B.1.4

Conduct specific, goal-directed research related to inventions and innovations.

STL.1.L, LA.A.1.4, LA.A.2.4, LA.B.2.4

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY--The student will be able to:

Identify systems thinking logic and creativity with appropriate compromises in complex real-life problems. STL.2.W

Define technological systems, which are the building blocks of technology, are embedded within larger technological, social, and environmental systems.

STL.2.X, LA.D.2.4

Identify the stability of a technological system and its influence by all of the components in the system, especially those in the feedback loop. STL.2.Y

Identify resources involves trade-offs between competing values, such as availability, cost, desirability, and waste. STL.2.Z, SS.D.1.4

Identify the criteria and constraints of a product or system and determine how they affect the final design and development. STL.2.AA, MA.A.5.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.3.4, SC.H.1.4

List strategies for optimizing a technological process or methodology of designing or making a product, dependent on criteria and constraints. STL.2.BB

Define a management system as the process of planning, organizing, and controlling work. STL.2.EE

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTIONS BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY--The student will be able to:

Identify technology transfer occurring when a new user applies an existing innovation developed for one purpose in a different function. STL.3.G, SC.H.3.4

Outline the process of patenting to protect a technological idea. STL.3.I
Identify technological progresses that promote the advancement of science and mathematics. STL.3.J, LA.A.1.4, LA.B.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY--The student will be able to:

Classify the use of technology involving weighing the trade-offs between the positive and negative effects. STL.4.I, LA.B.2.4

List the cultural, social, economic, and political changes caused by the transfer of a technology from one society to another. STL.4.K, LA.B.2.4, LA.E.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT--The student will be able to:

List trade-offs of developing technologies to reduce the use of resources. STL.5.H, SC.G.2.4, SS.D.1.4

Identify technologies devised to reduce the negative consequences of other technologies. STL.5.K

Discuss the implementation of technologies involving the weighing of trade-offs between predicted positive and negative effects on the environment. STL.5.L, SC.G.2.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY--The student will be able to:

Report how different cultures develop their own technologies to satisfy their individual and shared needs, wants, and values. STL.6.H, LA.D.2.4, SS.B.2.4

Consider societal opinions and demands, as well as corporate cultures to use as a basis for deciding whether or not to develop a technology. STL.6.I

Consider a number of different factors, such as advertising, the strength of the economy, the goals of a company, and the latest fads as contributors to shaping the design of and demand for various technologies. STL.6.J, LA.D.2.4, SS.A.1.4, SS.D.2.4

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY--The student will be able to:

Discuss how the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials. STL.7.H, LA.A.1.4, LA.A.2.4, LA.B.2.4, SC.H.3.4, SS.A.2.4

Discuss the history of technology as a powerful force in reshaping the social, cultural, political, and economic landscape. STL.7.I, LA.D.2.4, SS.A.2.4

Debate that early in the history of technology, the development of many tools and machines was based not on scientific knowledge, but on technological know-how. STL.7.J, SS.A.1.4

Discuss the Iron Age as the use of iron and steel as the primary materials for tools. STL.7.K

Discuss the Middle Ages and its development of many technological devices that produced long-lasting effects on technology and society. STL.7.L, SS.A.2.4

Discuss the Renaissance, a time of rebirth of the arts and humanities, as an important development in the history of technology. STL.7.M, SS.A.3.4

Discuss the Industrial Revolution as the development of continuous manufacturing, improved education and leisure time. STL.7.N, SS.A.5.4

Discuss the Information Age and its placement of emphasis on the processing and exchange of information. STL.7.O, SS.A.5.4

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN--

The student will be able to:

Describe the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results. STL.8.H

Translate design problems that are seldom presented in a clearly defined form. STL.8.I, LA.D.1.4, LA.D.2.4

Evaluate a design continually, and improve and revise the idea of the design as needed. STL.8.J, SC.H.1.4

Analyze competing requirements of a design, such as criteria, constraints, and efficiency. STL.8.K, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4

DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN--The

student will be able to:

Investigate design principles used to evaluate existing designs, to collect data, and to guide the design process. STL.9.I

Examine the influence of personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly on the engineering design process. STL.9.J, LA.D.1.4, SC.H.1.4

Construct a prototype or working model used to test a design concept by making actual observations and necessary adjustments. STL.9.K, MA.B.1.4, SC.H.1.4, SC.H.3.4

Consider factors taken into account in the process of engineering. STL.9.L

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING--The

student will be able to:

Employ research and development as a specific problem solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace. STL.10.I

Conduct research needed to solve technological problems. STL.10.J, LA.A.1.4, LA.A.2.4

Differentiate between technological and non-technological problems, and identify which problems can be solved using technology. STL.10.K, SC.H.1.4

Utilize a multidisciplinary approach to solving technological problems. STL.10.L, MA.A.1.4, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.1.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE ABILITIES TO APPLY THE DESIGN PROCESS--The student will be able to:

Interpret the design problem to solve and decide whether or not to address it. STL.11.M, SC.H.1.4

Consider criteria and constraints and determine how these will affect the design process. STL.11.N, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4, SC.H.1.4, SC.H.3.4

Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product. STL.11.O, SC.H.3.4

Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed. STL.11.P, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4

Develop and produce a product or system using a design process. STL.11.Q

Evaluate final solutions and communicate observation, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models. STL.11.R, LA.B.2.4, LA.C.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS--The student will be able to:

Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques. STL.12.L, LA.B.1.4, LA.B.2.4, LA.C.3.4

Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it. STL.12.M

Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision. STL.12.N

Operate systems so that they function in the way they were designed. STL.12.O

Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate. STL.12.P, LA.A.2.4, MA.E.1.4

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS--The student will be able to:

Collect information and evaluate its quality. STL.13.J, LA.A.2.4, SC.H.1.4

Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and environment. STL.13.K, LA.A.2.4, SC.G.1.4, SC.G.2.4, SC.H.1.4

Apply assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology. STL.13.L, LA.A.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4

Design forecasting techniques to evaluate the results of altering natural systems. STL.13.M, MA.E.3.4, SC.G.2.4

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES--The student will be able to:

Service products to keep them in good operating condition. STL.19.L

Classify materials based on their qualities as natural, synthetic, or mixed. STL.19.M

Classify goods as durable goods designed to operator for a long period of time, or non-durable goods designed to operate for a short period of time. STL.19.N

Identify and classify manufacturing systems into types, such as customized production, batch production, and continuous production. STL.19.O

Discuss the interchangeability of parts to increase the effectiveness of manufacturing processes. STL.19.P

Identify chemical technologies providing a means for humans to alter or modify materials and to produce chemical products. STL.19.Q

Employ marketing techniques involving establishing a product's identity, conducting research on its potential, advertising it, distributing it, and selling it. STL.19.R

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives. MA.B.3.4, MA.E.1.4

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display knowledge of the efficient use of human resources.

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

Define entrepreneurship.

Describe the importance of entrepreneurship to the American economy. SS.D.2.4

List the advantages and disadvantages of business ownership.

Identify the risks involved in ownership of a business.

Identify the necessary personal characteristics of a successful entrepreneur.

Identify the business skills needed to operate a small business efficiently and effectively.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ASSOCIATED WITH PRE-PROCESSING ACTIVITIES AND PRACTICES OF INDUSTRIAL MATERIALS--The student will be able to:

Define and describe the term “pre-processing” as it relates to industrial materials.

Describe the technical processes of extracting materials from natural resources.

Locate and order industrial materials.

Arrange for the appropriate transportation of industrial materials.

Store and protect industrial materials properly.

Follow proper precautions in the receiving, unpacking, and handling of industrial materials.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ASSOCIATED WITH PROCESSING ACTIVITIES AND PRACTICES OF INDUSTRIAL MATERIALS--The student will be able to:

Define and describe “processing” as it relates to industrial materials.

Demonstrate technical processing using a variety of composite and synthetic industrial materials.

Demonstrate understanding of both manual and automated processes.

Apply the technical processes of separating and forming a variety of industrial materials.

Apply the technical processes of conditioning a variety of industrial materials.

Apply the technical processes of combining in the fabrication and finishing of a product.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ASSOCIATED WITH POST-PROCESSING ACTIVITIES AND PRACTICES OF INDUSTRIAL MATERIALS--The student will be able to:

- Define and describe “post-processing” as it relates to industrial materials.
- Identify processes for distributing products made of industrial materials.
- Describe processes for installing products made of industrial materials.
- Describe processes for maintaining products made of industrial materials.
- Describe processes for altering products made of industrial materials.
- Describe processes for servicing products made of industrial materials.

DEMONSTRATE SAFE AND APPROPRIATE USE OF TOOLS AND MACHINES IN THE PROCESSING OF INDUSTRIAL MATERIALS--The student will be able to:

- Select appropriate tools, procedures, and/or equipment needed to produce a product.
- Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
- Maintain and troubleshoot equipment used in a variety of technological systems.
- Follow laboratory safety rules and procedures.
- Demonstrate good housekeeping at workstation within total laboratory.
- Identify color-coding safety standards.
- Explain fire prevention and safety precautions and practices for extinguishing fires.
- Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

PERFORM ADVANCED STUDY AND TECHNICAL SKILLS RELATED TO MATERIALS AND PROCESSES--The student will be able to:

- Select an individual or group project in cooperation with the teacher.
- Develop a written plan of work to carry out the project. LA.B.1.4, LA.B.2.4
- Show evidence of technical study in support of the project. LA.A.1.4, LA.A.2.4
- Perform skills related to the project.
- Complete the project as planned.

Course Title: Materials and Processes Technology III

Course Credit: 1

COURSE DESCRIPTION: This course provides students with an advanced understanding of the knowledge, human relations, and technical skills of industrial materials and processes technology.

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY--The student will be able to:

Discuss the nature and development of technological knowledge and processes.

STL.1.J, LA.B.2.4, LA.C.3.4, SC.H.3.4

Explain the rapid increase in the rate of technological development and diffusion.

STL.1.K, LA.B.2.4, LA.D.2.4, MA.B.1.4

Conduct specific, goal-directed research related to inventions and innovations.

STL.1.L, LA.A.1.4, LA.A.2.4, LA.B.2.4

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY--The student will be able to:

Identify systems thinking logic and creativity with appropriate compromises in complex real-life problems. STL.2.W

Assess technological systems, which are the building blocks of technology, are embedded within larger technological, social, and environmental systems.

STL.2.X, LA.D.2.4

Assess the stability of a technological system and its influence by all of the components in the system, especially those in the feedback loop. STL.2.Y

Compare resources involves trade-offs between competing values, such as availability, cost, desirability, and waste. STL.2.Z, SS.D.1.4

Identify the criteria and constraints of a product or system and determine how they affect the final design and development. STL.2.AA, MA.A.5.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.3.4, SC.H.1.4

Propose strategies for optimizing a technological process or methodology of designing or making a product, dependent on criteria and constraints. STL.2.BB

Organize a management system as the process of planning, organizing, and controlling work. STL.2.EE

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTIONS BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY--The student will be able to:

Create technology transfer occurring when a new user applies an existing innovation developed for one purpose in a different function. STL.3.G, SC.H.3.4

Outline the process of patenting to protect a technological idea. STL.3.I
Investigate technological progresses that promote the advancement of science and mathematics. STL.3.J, LA.A.1.4, LA.B.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY--The student will be able to:

Report how different cultures develop their own technologies to satisfy their individual and shared needs, wants, and values. STL.6.H, LA.D.2.4, SS.B.2.4
Consider societal opinions and demands, as well as corporate cultures to use as a basis for deciding whether or not to develop a technology. STL.6.I
Evaluate a number of different factors, such as advertising, the strength of the economy, the goals of a company, and the latest fads as contributors to shaping the design of and demand for various technologies. STL.6.J, LA.D.2.4, SS.A.1.4, SS.D.2.4

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN--

The student will be able to:

Implement the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results. STL.8.H
Translate design problems that are seldom presented in a clearly defined form. STL.8.I, LA.D.1.4, LA.D.2.4
Evaluate a design continually, and improve and revise the idea of the design as needed. STL.8.J, SC.H.1.4
Analyze competing requirements of a design, such as criteria, constraints, and efficiency. STL.8.K, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4

DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN--The student will be able to:

Select design principles used to evaluate existing designs, to collect data, and to guide the design process. STL.9.I
Examine the influence of personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly on the engineering design process. STL.9.J, LA.D.1.4, SC.H.1.4
Construct a prototype or working model used to test a design concept by making actual observations and necessary adjustments. STL.9.K, MA.B.1.4, SC.H.1.4, SC.H.3.4

Evaluate factors taken into account in the process of engineering. STL.9.L

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING--The

student will be able to:

Employ research and development as a specific problem solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace. STL.10.I

Conduct research needed to solve technological problems. STL.10.J, LA.A.1.4, LA.A.2.4

Differentiate between technological and non-technological problems, and identify which problems can be solved using technology. STL.10.K, SC.H.1.4

Utilize a multidisciplinary approach to solving technological problems. STL.10.L, MA.A.1.4, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.1.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE ABILITIES TO APPLY THE DESIGN PROCESS--The student will be able to:

Interpret the design problem to solve and decide whether or not to address it. STL.11.M, SC.H.1.4

Evaluate criteria and constraints and determine how these will affect the design process. STL.11.N, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4, SC.H.1.4, SC.H.3.4

Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product. STL.11.O, SC.H.3.4

Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed. STL.11.P, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4

Develop and produce a product or system using a design process. STL.11.Q

Evaluate final solutions and communicate observation, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models. STL.11.R, LA.B.2.4, LA.C.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS--The student will be able to:

Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques. STL.12.L, LA.B.1.4, LA.B.2.4, LA.C.3.4

Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it. STL.12.M

Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision. STL.12.N

Operate systems so that they function in the way they were designed. STL.12.O

Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate. STL.12.P, LA.A.2.4, MA.E.1.4

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS--The student will be able to:

Collect information and evaluate its quality. STL.13.J, LA.A.2.4, SC.H.1.4

Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and environment. STL.13.K, LA.A.2.4, SC.G.1.4, SC.G.2.4, SC.H.1.4

Apply assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology. STL.13.L, LA.A.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4

Design forecasting techniques to evaluate the results of altering natural systems. STL.13.M, MA.E.3.4, SC.G.2.4

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES--The student will be able to:

Service products to keep them in good operating condition. STL.19.L

Classify materials based on their qualities as natural, synthetic, or mixed. STL.19.M

Classify goods as durable goods designed to operator for a long period of time, or non-durable goods designed to operate for a short period of time. STL.19.N

Identify and classify manufacturing systems into types, such as customized production, batch production, and continuous production. STL.19.O

Discuss the interchangeability of parts to increase the effectiveness of manufacturing processes. STL.19.P

Identify chemical technologies providing a means for humans to alter or modify materials and to produce chemical products. STL.19.Q

Employ marketing techniques involving establishing a product's identity, conducting research on its potential, advertising it, distributing it, and selling it. STL.19.R

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives. MA.B.3.4, MA.E.1.4

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display knowledge of the efficient use of human resources.

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

Define entrepreneurship.

Describe the importance of entrepreneurship to the American economy. SS.D.2.4

Explain the advantages and disadvantages of business ownership.

Identify the risks involved in ownership of a business.

Identify the necessary personal characteristics of a successful entrepreneur.

Identify the business skills needed to operate a small business efficiently and effectively.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ASSOCIATED WITH PRE-PROCESSING ACTIVITIES AND PRACTICES OF INDUSTRIAL MATERIALS--The student will be able to:

Define and describe the term “pre-processing” as it relates to industrial materials.

Describe the technical processes of extracting materials from natural resources.

Locate and order industrial materials.

Arrange for the appropriate transportation of industrial materials.

Store and protect industrial materials properly.

Follow proper precautions in the receiving, unpacking, and handling of industrial materials.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ASSOCIATED WITH PROCESSING ACTIVITIES AND PRACTICES OF INDUSTRIAL MATERIALS--The student will be able to:

Define and describe “processing” as it relates to industrial materials.

Demonstrate technical processing using a variety of industrial materials.

Demonstrate technical ability to utilize automated processing equipment.

Apply the technical processes of separating and forming a variety of industrial materials.

Apply the technical processes of conditioning a variety of industrial materials.
Apply the technical processes of combining in the fabrication and finishing of a product.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ASSOCIATED WITH POST-PROCESSING ACTIVITIES AND PRACTICES OF INDUSTRIAL MATERIALS--The student will be able to:

Define and describe "post-processing" as it relates to industrial materials.
Identify processes for distributing products made of industrial materials.
Describe processes for installing products made of industrial materials.
Describe processes for maintaining products made of industrial materials.
Describe processes for altering products made of industrial materials.
Describe processes for servicing products made of industrial materials.

DEMONSTRATE SAFE AND APPROPRIATE USE OF TOOLS AND MACHINES IN THE PROCESSING OF INDUSTRIAL MATERIALS--The student will be able to:

Select appropriate tools, procedures, and/or equipment needed to produce a product.
Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
Maintain and troubleshoot equipment used in a variety of technological systems.
Follow laboratory safety rules and procedures.
Demonstrate good housekeeping at workstation within total laboratory. Identify color-coding safety standards.
Explain fire prevention and safety precautions and practices for extinguishing fires.
Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

PERFORM ADVANCED STUDY AND TECHNICAL SKILLS RELATED TO INDUSTRIAL MATERIALS AND PROCESSES--The student will be able to:

Identify and research a design problem related to materials and processes.
LA.A.1.4, LA.A.2.4, SC.A.1.4, SC.D.2.4, SC.E.2.4, SC.H.1.4, SC.H.3.4
Produce a detailed design and plan for the production of the solution. MA.B.4.4, SC.E.2.4, SC.H.3.4
Complete the advanced design project as planned.
Deliver a professional quality presentation of the design process and solution.
LA.A.1.4, LA.A.2.4, LA.C.3.4

DEMONSTRATE UNDERSTANDING OF CAREER OPPORTUNITIES AND REQUIREMENTS IN THE FIELD OF MATERIALS AND PROCESSES TECHNOLOGY.

—The student will be able to:

Discuss individual interests related to a career in materials and processes.

LA.B.2.4

Explore career opportunities related to materials and processes. LA.A.1.4,

LA.A.2.4, LA.B.2.4

Explore secondary education opportunities related to materials and processes.

LA.A.1.4, LA.A.2.4, LA.B.2.4

Conduct a job search. LA.A.1.4, LA.A.2.4

Complete a job application form correctly. LA.B.2.4

Demonstrate competence in job interview techniques. LA.C.1.4, LA.C.3.4,

LA.D.1.4

Create a professional resume and letter of introduction. LA.A.1.4,

LA.A.2.4, LA.B.1.4, LA.B.2.4

Solicit awards, letters of recommendation and recognition. LA.A.1.4, LA.A.2.4,

LA.C.3.4, LA.D.1.4

Organize work samples in a professional, presentable format. LA.B.2.4, LA.C.3.4,

LA.D.1.4

Program Title: Production Technology

Occupational Area: Technology Education

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 production technology and its effect upon our lives and the choosing of an occupation. The content and activities will also include the study of entrepreneurship, safety, and leadership skills. 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.

Listed below are the courses that make up this program.

Production Technology I
Production Technology II
Production Technology III

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

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 academic and 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>>.

Laboratory/classroom safety rules and procedures which include but are not limited to the safe use of appropriate tools, operation of equipment and fire prevention precautions must be understood and followed at all times.

The student should demonstrate an understanding of prior grade specific knowledge covered in the national Standards for Technological Literacy* (STL) and the Florida Sunshine State Standards. Benchmarks followed by a reference code indicate alignment with one or both of these documents.

* Standards for Technological Literacy: Content for the Study of Technology.
Copyright 2000 by the International Technology Education Association. Reston,
VA.

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

TECHNOLOGICAL LITERACY STANDARDS

Demonstrate an understanding of the characteristics and scope of technology.
Demonstrate an understanding of the core concepts of technology.
Demonstrate an understanding of the relationships among technologies and the connection between technology and other fields of study.
Demonstrate an understanding of the cultural, social, economic, and political effects of technology.
Demonstrate an understanding of the effects of technology on the environment.
Demonstrate an understanding of the influence of technology on history.
Demonstrate an understanding of the attributes of design.
Demonstrate an understanding of the engineering design.
Demonstrate an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
Demonstrate the abilities to apply the design process.
Demonstrate the abilities to use and maintain technological products and systems.
Demonstrate the abilities to assess the impact of products and systems.
Demonstrate an understanding of and be able to select and use manufacturing technologies.
Demonstrate an understanding of and be able to select and use construction technologies.

TECHNICAL CONTENT STANDARDS

Demonstrate safe and appropriate use of tools, machines, and materials in production technology.
Demonstrate the ability to properly identify, organize, plan, and allocate resources.
Demonstrate an understanding of entrepreneurship.
Produce a custom product from industrial materials and composites using preprocessing, processing, and post-processing production technology skills.
Plan and participate in a mass production system for manufacturing a product.

Utilize modern production technology in the processes of separating, forming, combining, fabrication and finishing of materials.

Demonstrate technical knowledge and skills in the designing and engineering of constructed works.

Demonstrate technical knowledge and skills in the contracting, estimating, bidding, and scheduling processes.

Demonstrate technical knowledge and skill in the construction and finishing of structures.

Perform advanced study and technical skills related to production technology.

Demonstrate an understanding of career opportunities and requirements in the field of production technology.

Course Title: Production Technology I

Course Credit: 1

COURSE DESCRIPTION: This course provides students with an introduction to the knowledge, human relations, and technological skills found today in production technology.

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY--The student will be able to:

Discuss the nature and development of technological knowledge and processes.

STL.1.J, LA.B.2.4, LA.C.3.4, SC.H.3.4

Explain the rapid increase in the rate of technological development and diffusion.

STL.1.K, LA.B.2.4, LA.D.2.4, MA.B.1.4

Conduct specific goal-directed research related to inventions and innovations.

STL.1.L, LA.A.1.4, LA.A.2.4, LA.B.2.4

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY—The student will be able to:

Identify systems thinking logic and creativity with appropriate compromises in complex real-life problems. STL.2.W

Define technological systems, which are the building blocks of technology and are embedded within larger technological, social, and environmental systems.

STL.2.X, LA.D.2.4

Identify resources involving trade-offs between competing values, such as availability, cost, desirability, and waste. STL.2.Z, SS.D.1.4

Identify the criteria and constraints of a product or system and determine how they affect the final design and development. STL.2.AA, MA.A.5.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.3.4, SC.H.1.4

Define a management system as the process of planning, organizing, and controlling work. STL.2.EE

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTION BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY.—The student will be able to:

Identify technology transfer occurring when a new user applies an existing innovation developed for one purpose in a different function. STL.3.G, SC.H.3.4

Identify technological innovation resulting when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields. STL.3.H, SC.H.3.4

Outline the process of patenting to protect a technological idea. STL.3.I

Identify technological progresses that promote the advancement of science and mathematics. STL.3.J, LA.A.1.4, LA.B.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY--The student will be able to:

Classify the use of technology involving weighing the trade-offs between the positive and the negative effects. STL.4.I, LA.B.2.4

Identify ethical considerations important in the development, selection, and use of technologies. STL.4.J, SC.H.1.4, SS.C.2.4

List the cultural, social, economic, and political changes caused by the transfer of a technology from one society to another. STL.4.K, LA.B.2.4, LA.E.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT. --The student will be able to:

List trade-offs of developing technologies to reduce the use of resources. STL.5.H, SC.G.2.4, SS.D.1.4

Identify technologies devised to reduce the negative consequences of other technologies. STL.5.K

Discuss the implementation of technologies involving the weighing of trade-offs between predicted positive and negative effects on the environment. STL.5.L, SC.G.2.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY--The student will be able to:

Research how the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials. STL.7.H, LA.A.1.4, LA.A.2.4, LA.B.2.4, SC.H.3.4, SS.A.2.4

Define the history of technology as a powerful force in reshaping the social, cultural, political, and economic landscape. STL.7.I, LA.D.2.4, SS.A.2.4

Discuss that early in the history of technology, the development of many tools and machines was based not on scientific knowledge but on technological know-how. STL.7.J, SS.A.1.4

Define the Iron Age as the use of iron and steel as the primary materials for tools. STL.7.K

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN--The student will be able to:

Recognize the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints,

exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results. STL.8.H

Restate design problems that are seldom presented in a clearly defined form. STL.8.I, LA.D.1.4, LA.D.2.4

Check and critique a design continually, and improve and revise the idea of the design as needed. STL.8.J, SC.H.1.4

List competing requirements of a design, such as criteria, constraints, and efficiency. STL.8.K, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4

DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN--The student will be able to:

Identify design principles used to evaluate existing designs, to collect data, and to guide the design process. STL.9.I

Describe the influence of personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly on the engineering design process. STL.9.J, LA.D.1.4, SC.H.1.4

Construct a prototype or a working model used to test a design concept by making actual observations and necessary adjustments. STL.9.K, MA.B.1.4, SC.H.1.4, SC.H.3.4

Identify factors taken into account in the process of engineering. STL.9.L

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING--The student will be able to:

Define research and development as a specific problem solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace. STL.10.I

Identify research needed to solve technological problems. STL.10.J, LA.A.1.4, LA.A.2.4

Differentiate between technological and non-technological problems, and identify which problems can be solved using technology. STL.10.K, SC.H.1.4

Utilize a multidisciplinary approach to solving technological problems. STL.10.L, MA.A.1.4, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.1.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS--The student will be able to:

Identify the design problem to solve and decide whether or not to address it.

STL.11.M, SC.H.1.4

List criteria and constraints and determine how these will affect the design process. STL.11.N, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4, SC.H.1.4, SC.H.3.4

Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product. STL.11.O

Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed. STL.11.P, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, SC.H.1.4, SC.H.3.4

Develop a product or system using a design process. STL.11.Q

Evaluate final solutions and communicate observations, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models. STL.11.R, LA.B.2.4, LA.C.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS--The student will be able to:

Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques. STL.12.L, LA.B.1.4, LA.B.2.4, LA.C.3.4

Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it. STL.12.M

Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision. STL.12.N

Operate systems so that they function in the way they were designed. STL.12.O

Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate. STL.12.P, LA.A.2.4, MA.E.1.4

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS--The student will be able to:

Collect information and evaluate its quality. STL.13.J, LA.A.2.4, SC.H.1.4

Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and the environment. STL.13.K, LA.A.2.4, SC.G.1.4, SC.G.2.4, SC.H.1.4,

Define assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology. STL.13.L, LA.A.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4

Identify forecasting techniques to evaluate the results of altering natural systems. STL.13.M, MA.E.3.4, SC.G.2.4

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES--The student will be able to:

Service products to keep them in good operating condition. STL.19.L

Classify materials based on their qualities as natural, synthetic, or mixed.

STL.19.M

Classify goods as durable goods designed to operate for a long period of time, or non-durable goods designed to operate for a short period of time. STL.19.N

Identify and classify manufacturing systems into types, such as customized production, batch production, and continuous production. STL.19.O

Discuss the interchangeability of parts to increase the effectiveness of manufacturing processes. STL.19.P

Identify chemical technologies providing a means for humans to alter or modify materials and to produce chemical products. STL.19.Q

Employ marketing techniques involving establishing a product's identity, conducting research on its potential, advertising it, distributing it, and selling it.

STL.19.R

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE CONSTRUCTION TECHNOLOGIES--The student will be able to:

Define infrastructure as the underlying base or basic framework of a system.

STL.20.J

Identify a variety of processes and procedures used in constructing structures.

STL.20.K

Identify requirements involved in the design of structures. STL.20.L

Recommend maintenance, alterations, or renovations to improve a structure or alter its intended use. STL.20.M

Identify prefabricated materials used in some structures. STL.20.N

DEMONSTRATE SAFE AND APPROPRIATE USE OF TOOLS AND MACHINES IN PRODUCTION TECHNOLOGY--The student will be able to:

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to manufacture a product.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at workstation within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives. MA.B.3.4, MA.E.1.4

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display an understanding of the efficient use of human resources.

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

Define entrepreneurship.

Describe the importance of entrepreneurship to the American economy. SS.D.2.4

List the advantages and disadvantages of business ownership.

Identify the risks involved in ownership of a business.

Identify the necessary personal characteristics of a successful entrepreneur.

Identify the business skills needed to operate a small business efficiently and effectively.

PRODUCE A CUSTOM PRODUCT FROM INDUSTRIAL MATERIALS AND COMPOSITES USING PREPROCESSING, PROCESSING, AND POSTPROCESSING PRODUCTION TECHNOLOGY SKILLS--The student will be able to:

Apply the technology processes of separating and forming materials.

Apply the technology processes of conditioning materials.

Apply the technology processes of combining in the fabrication and finishing of materials.

Apply modern production technology practices and equipment in the processes of separating, forming, conditioning, fabricating and finishing of materials (CNC, CAD, CAM, Robotics, etc.).

Produce a custom product.

PLAN AND PARTICIPATE IN A MASS PRODUCTION SYSTEM FOR MANUFACTURING A PRODUCT--The student will be able to:

Design and develop jigs, fixtures, or a model system for product mass production.
Develop an organized plan of tools, materials, processes, and systems to efficiently mass-produce a product. LA.B.1.4, LA.B.2.4
Apply pre-processing, processing, and post-processing techniques in the mass production of a product.
Participate in the organized mass production of a product.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE DESIGNING AND ENGINEERING OF CONSTRUCTED WORKS--The student will be able to:

Develop construction plans using appropriate tools, symbols, and technical drawing techniques. LA.B.2.4
Describe building codes, permits, and inspection requirements.
Sketch and draw a plan for a construction project. MA.B.1.4, MA.B.4.4, MA.C.1.4, MA.C.3.4
Display knowledge about regional planning and the construction of civil and community projects (roads, parks, dams, airports, seaports, warehouses, shopping centers, factories, skyscrapers, etc.).

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE CONSTRUCTION AND FINISHING OF STRUCTURES--The student will be able to:

Describe the properties of structures.
Use appropriate terminology associated with construction technology.
Identify and describe the materials used in the construction of superstructures.
Apply a variety of techniques, tools, materials, and processes in the construction of structures.

Course Title: Production Technology II

Course Credit: 1

COURSE DESCRIPTION: This program provides students with an intermediate understanding of the knowledge, human relations, and technological skills found today in production technology.

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY--The student will be able to:

Discuss the nature and development of technological knowledge and processes.

STL.1.J, LA.B.2.4, LA.C.3.4, SC.H.3.4

Explain the rapid increase in the rate of technological development and diffusion.

STL.1.K, LA.B.2.4, LA.D.2.4, MA.B.1.4

Conduct specific goal-directed research related to inventions and innovations.

STL.1.L, LA.A.1.4, LA.A.2.4, LA.B.2.4

Discuss current technological developments that are/were driven by profit motive and the market. STL.1.M, SS.D.1.4

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY—The student will be able to:

Apply systems thinking logic and creativity with appropriate compromises in complex real-life problems. STL.2.W

Discuss technological systems, which are the building blocks of technology and are embedded within larger technological, social, and environmental systems.

STL.2.X, LA.D.2.4

Select resources involving trade-offs between competing values, such as availability, cost, desirability, and waste. STL.2.Z, SS.D.1.4

Identify the criteria and constraints of a product or system and determine how they affect the final design and development. STL.2.AA, MA.A.5.4, MA.B.1.4,

MA.B.3.4, MA.B.4.4, MA.E.3.4, SC.H.1.4

List strategies for optimizing a technological process or methodology of designing or making a product, dependent on criteria and constraints. STL.2.BB

Discuss new technologies that create new processes. STL.2.CC

Describe a quality control process to ensure that a product, service, or system meets established criteria. STL.2.DD

Organize a management system as the process of planning, organizing, and controlling work. STL.2.EE

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTION BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY.—The student will be able to:

Discuss technology transfer occurring when a new user applies an existing innovation developed for one purpose in a different function. STL.3.G, SC.H.3.4

Explain technological innovation resulting when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields. STL.3.H, SC.H.3.4

Report the process of patenting to protect a technological idea. STL.3.I

Discuss technological progresses that promote the advancement of science and mathematics. STL.3.J, LA.A.1.4, LA.B.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY--The student will be able to:

Compare the use of technology involving weighing the trade-offs between the positive and the negative effects. STL.4.I, LA.B.2.4

Discuss ethical considerations important in the development, selection, and use of technologies. STL.4.J, SC.H.1.4, SS.C.2.4

Debate the cultural, social, economic, and political changes caused by the transfer of a technology from one society to another. STL.4.K, LA.B.2.4, LA.E.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT. --The student will be able to:

Compare trade-offs of developing technologies to reduce the use of resources. STL.5.H, SC.G.2.4, SS.D.1.4

Identify technology to monitor the environment and provide information as a basis for decision-making. STL.5.I, SC.H.3.4

Discuss technologies devised to reduce the negative consequences of other technologies. STL.5.K

Make decisions about the implementation of technologies involving the weighing of trade-offs between predicted positive and negative effects on the environment. STL.5.L, SC.G.2.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY--The student will be able to:

Discuss how the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials. STL.7.H, LA.A.1.4, LA.A.2.4, LA.B.2.4, SC.H.3.4, SS.A.2.4

Research the history of technology as a powerful force in reshaping the social, cultural, political, and economic landscape. STL.7.I, LA.D.2.4, SS.A.2.4

Debate that early in the history of technology, the development of many tools and machines was based not on scientific knowledge but on technological know-how. STL.7.J, SS.A.1.4

Define the Iron Age as the use of iron and steel as the primary materials for tools. STL.7.K

Define the Middle Ages and its development of many technological devices that produced long-lasting effects on technology and society. STL.7.L, SS.A.2.4

Define the Renaissance, a time of rebirth of the arts and humanities, as an important development in the history of technology. STL.7.M, SS.A.3.4

Define the Industrial Revolution and the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time. STL.7.N, SS.A.5.4

Define the Information Age and its placement of emphasis on the processing and exchange of information. STL.7.O, SS.A.5.4

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN--

The student will be able to:

Apply the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results. STL.8.H

Translate design problems that are seldom presented in a clearly defined form. STL.8.I, LA.D.1.4, LA.D.2.4

Evaluate a design continually, and improve and revise the idea of the design as needed. STL.8.J, SC.H.1.4

Consider competing requirements of a design, such as criteria, constraints, and efficiency. STL.8.K, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4

DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN--The

student will be able to:

Investigate design principles used to evaluate existing designs, to collect data, and to guide the design process. STL.9.I

Examine the influence of personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly on the engineering design process. STL.9.J, LA.D.1.4, SC.H.1.4

Construct a prototype or a working model used to test a design concept by making actual observations and necessary adjustments. STL.9.K, MA.B.1.4, SC.H.1.4, SC.H.3.4

Evaluate factors taken into account in the process of engineering. STL.9.L

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING--The

student will be able to:

Employ research and development as a specific problem solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace. STL.10.I

Conduct research needed to solve technological problems. STL.10.J, LA.A.1.4, LA.A.2.4

Differentiate between technological and non-technological problems, and identify which problems can be solved using technology. STL.10.K, SC.H.1.4

Utilize a multidisciplinary approach to solving technological problems. STL.10.L, MA.A.1.4, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.1.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS--The

student will be able to:

Interpret the design problem to solve and decide whether or not to address it. STL.11.M, SC.H.1.4

Evaluate criteria and constraints and determine how these will affect the design process. STL.11.N, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4, SC.H.1.4, SC.H.3.4

Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product. STL.11.O

Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed. STL.11.P, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, SC.H.1.4, SC.H.3.4

Produce a product or system using a design process. STL.11.Q

Evaluate final solutions and communicate observations, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written

means, in addition to three-dimensional models. STL.11.R, LA.B.2.4, LA.C.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS--The student will be able to:

Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques. STL.12.L, LA.B.1.4, LA.B.2.4, LA.C.3.4

Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it. STL.12.M

Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision. STL.12.N

Operate systems so that they function in the way they were designed. STL.12.O

Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate. STL.12.P, LA.A.2.4, MA.E.1.4

Use the tools of data analysis for managing information. MA.E.1.4

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS--The student will be able to:

Collect information and evaluate its quality. STL.13.J, LA.A.2.4, SC.H.1.4

Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and the environment. STL.13.K, LA.A.2.4, SC.G.1.4, SC.G.2.4, SC.H.1.4

Apply assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology. STL.13.L, LA.A.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4

Design forecasting techniques to evaluate the results of altering natural systems. STL.13.M, MA.E.3.4, SC.G.2.4

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES--The student will be able to:

Service products to keep them in good operating condition. STL.19.L

Classify materials based on their qualities as natural, synthetic, or mixed. STL.19.M

Classify goods as durable goods designed to operate for a long period of time, or non-durable goods designed to operate for a short period of time. STL.19.N

Identify and classify manufacturing systems into types, such as customized production, batch production, and continuous production. STL.19.O

Discuss the interchangeability of parts to increase the effectiveness of manufacturing processes. STL.19.P

Identify chemical technologies providing a means for humans to alter or modify materials and to produce chemical products. STL.19.Q

Employ marketing techniques involving establishing a product's identity, conducting research on its potential, advertising it, distributing it, and selling it. STL.19.R

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE CONSTRUCTION TECHNOLOGIES--The student will be able to:

Define infrastructure as the underlying base or basic framework of a system.

STL.20.J

Identify a variety of processes and procedures used in constructing structures.

STL.20.K

Identify requirements involved in the design of structures. STL.20.L

Recommend maintenance, alterations, or renovations to improve a structure or alter its intended use. STL.20.M

Identify prefabricated materials used in some structures. STL.20.N

DEMONSTRATE SAFE AND APPROPRIATE USE OF TOOLS AND MACHINES IN PRODUCTION TECHNOLOGY--The student will be able to:

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to manufacture a product.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at workstation within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives. MA.B.3.4, MA.E.1.4

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display an understanding of the efficient use of human resources.

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

Define entrepreneurship.

Describe the importance of entrepreneurship to the American economy. SS.D.2.4

List the advantages and disadvantages of business ownership.

Identify the risks involved in ownership of a business.

Identify the necessary personal characteristics of a successful entrepreneur.

Identify the business skills needed to operate a small business efficiently and effectively.

PRODUCE A CUSTOM PRODUCT FROM INDUSTRIAL MATERIALS AND COMPOSITES USING PREPROCESSING, PROCESSING, AND POSTPROCESSING PRODUCTION TECHNOLOGY SKILLS--The student will be able to:

Apply the technology processes of separating and forming materials.

Apply the technology processes of conditioning materials.

Apply the technology processes of combining in the fabrication and finishing of materials.

Produce a custom product.

PLAN AND PARTICIPATE IN A MASS PRODUCTION SYSTEM FOR MANUFACTURING A PRODUCT--The student will be able to:

Design and develop jigs, fixtures, or a model system for product mass production.

Develop an organized plan of tools, materials, processes, and systems to efficiently mass-produce a product. LA.B.1.4, LA.B.2.4

Apply pre-processing, processing, and post-processing techniques in the mass production of a product.

Participate in the organized mass production of a product.

UTILIZE MODERN PRODUCTION TECHNOLOGY IN THE PROCESSES OF SEPARATING, FORMING, COMBINING, FABRICATION, AND FINISHING OF MATERIALS--The student will be able to:

Design a program to be used in the separating forming and finishing of materials.

Develop and perform an operational program of forming materials.

Develop and perform an operational program of finishing materials.

Develop and perform an operational program that will use combination of modern production processes, equipment, and materials.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE DESIGNING AND ENGINEERING OF CONSTRUCTED WORKS--The student will be able to:

Develop construction plans using appropriate tools, symbols, and technical drawing techniques. LA.B.2.4

Describe building codes, permits, and inspection requirements.

Sketch and draw a plan for a construction project. MA.B.1.4, MA.B.4.4, MA.C.1.4, MA.C.3.4

Display knowledge about regional planning and the construction of civil and community projects (roads, parks, dams, airports, seaports, warehouses, shopping centers, factories, skyscrapers, etc.).

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE CONSTRUCTION AND FINISHING OF STRUCTURES--The student will be able to:

Describe the properties of structures.

Use appropriate terminology associated with construction technology.

Identify and describe the materials used in the construction of superstructures.

Apply a variety of techniques, tools, materials, and processes in the construction of structures.

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

Select an individual or group project in cooperation with the teacher.

Develop a written plan of work to carry out the project. LA.B.1.4, LA.B.2.4

Show evidence of technical study in support of the project. LA.A.1.4, LA.A.2.4

Perform skills related to the project.

Complete the project as planned.

Course Title: Production Technology III

Course Credit: 1

COURSE DESCRIPTION: This program provides students with an advanced understanding of the knowledge, human relations, and technological skills found today in production technology.

DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY--The student will be able to:

Graph the rapid increase in the rate of technological development and diffusion.

STL.1.K, LA.B.2.4, LA.D.2.4, MA.B.1.4

Conduct specific goal-directed research related to inventions and innovations.

STL.1.L, LA.A.1.4, LA.A.2.4, LA.B.2.4

Evaluate current technological developments that are/were driven by profit motive and the market. STL.1.M, SS.D.1.4

DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY—The student will be able to:

Apply systems thinking logic and creativity with appropriate compromises in complex real-life problems. STL.2.W

Assess technological systems, which are the building blocks of technology and are embedded within larger technological, social, and environmental systems.

STL.2.X, LA.D.2.4

Assess the stability of a technological system and its influence by all of the components in the system, especially those in the feedback loop. STL.2.Y

Compare resources involving trade-offs between competing values, such as availability, cost, desirability, and waste. STL.2.Z, SS.D.1.4

Identify the criteria and constraints of a product or system and determine how they affect the final design and development. STL.2.AA, MA.A.5.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.3.4, SC.H.1.4

Propose strategies for optimizing a technological process or methodology of designing or making a product, dependent on criteria and constraints. STL.2.BB

Discuss new technologies that create new processes. STL.2.CC

Recommend a quality control process to ensure that a product, service or system meets established criteria. STL.2.DD

Organize a management system as the process of planning, organizing, and controlling work. STL.2.EE

Outline complex systems that have many layers of controls and feedback loops to provide information. STL.2.FF

DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTION BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY.—The student will be able to:

Identify technology transfer occurring when a new user applies an existing innovation developed for one purpose in a different function. STL.3.G, SC.H.3.4

Identify technological innovation resulting when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields. STL.3.H, SC.H.3.4

Outline the process of patenting to protect a technological idea. STL.3.I

Identify technological progresses that promote the advancement of science and mathematics. STL.3.J, LA.A.1.4, LA.B.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY--The student will be able to:

Classify the use of technology involving weighing the trade-offs between the positive and the negative effects. STL.4.I, LA.B.2.4

Identify ethical considerations important in the development, selection, and use of technologies. STL.4.J, SC.H.1.4, SS.C.2.4

List the cultural, social, economic, and political changes caused by the transfer of a technology from one society to another. STL.4.K, LA.B.2.4, LA.E.1.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT. --The student will be able to:

Select technologies to conserve water, soil, and energy through such techniques as reusing, reducing and recycling. STL.5.G, SC.G.1.4, SC.G.2.4, SS.B.2.4

List trade-offs of developing technologies to reduce the use of resources. STL.5.H, SC.G.2.4, SS.D.1.4

Use technology to monitor the environment and provide information as a basis for decision-making. STL.5.I, SC.H.3.4

Identify technologies devised to reduce the negative consequences of other technologies. STL.5.K

Discuss the implementation of technologies involving the weighing of trade-offs between predicted positive and negative effects on the environment. STL.5.L, SC.G.2.4, SC.H.3.4

DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY--The student will be able to:

Assess how the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials. STL.7.H, LA.A.1.4, LA.A.2.4, LA.B.2.4, SC.H.3.4, SS.A.2.4

Research the history of technology as a powerful force in reshaping the social, cultural, political, and economic landscape. STL.7.I, LA.D.2.4, SS.A.2.4

Debate that early in the history of technology, the development of many tools and machines was based not on scientific knowledge but on technological know-how. STL.7.J, SS.A.1.4

Define the Iron Age as the use of iron and steel as the primary materials for tools. STL.7.K

Discuss the Industrial Revolution and the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time. STL.7.N, SS.A.5.4

DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN--

The student will be able to:

Apply the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results. STL.8.H

Translate design problems that are seldom presented in a clearly defined form. STL.8.I, LA.D.1.4, LA.D.2.4

Evaluate a design continually, and improve and revise the idea of the design as needed. STL.8.J, SC.H.1.4

Analyze competing requirements of a design, such as criteria, constraints, and efficiency. STL.8.K, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4

DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN--The

student will be able to:

Select design principles used to evaluate existing designs, to collect data, and to guide the design process. STL.9.I

Examine the influence of personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly on the engineering design process. STL.9.J, LA.D.1.4, SC.H.1.4

Construct a prototype or a working model used to test a design concept by making actual observations and necessary adjustments. STL.9.K, MA.B.1.4, SC.H.1.4, SC.H.3.4

Evaluate factors taken into account in the process of engineering. STL.9.L

DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF TROUBLESHOOTING, RESEARCH AND DEVELOPMENT, INVENTION AND INNOVATION, AND EXPERIMENTATION IN PROBLEM SOLVING--The

student will be able to:

Employ research and development as a specific problem solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace. STL.10.I

Conduct research needed to solve technological problems. STL.10.J, LA.A.1.4, LA.A.2.4

Differentiate between technological and non-technological problems, and identify which problems can be solved using technology. STL.10.K, SC.H.1.4

Utilize a multidisciplinary approach to solving technological problems. STL.10.L, MA.A.1.4, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.1.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS--The

student will be able to:

Interpret the design problem to solve and decide whether or not to address it. STL.11.M, SC.H.1.4

Evaluate criteria and constraints and determine how these will affect the design process. STL.11.N, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4, SC.H.1.4, SC.H.3.4

Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product. STL.11.O

Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed. STL.11.P, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, SC.H.1.4, SC.H.3.4

Produce a product or system using a design process. STL.11.Q

Evaluate final solutions and communicate observations, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models. STL.11.R, LA.B.2.4, LA.C.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS--The student will be able to:

Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques. STL.12.L, LA.B.1.4, LA.B.2.4, LA.C.3.4

Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it. STL.12.M

Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision. STL.12.N

Operate systems so that they function in the way they were designed. STL.12.O

Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate. STL.12.P, LA.A.2.4, MA.E.1.4

DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS--The student will be able to:

Collect information and evaluate its quality. STL.13.J, LA.A.2.4, SC.H.1.4

Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and the environment. STL.13.K, LA.A.2.4, SC.G.1.4, SC.G.2.4, SC.H.1.4

Apply assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology. STL.13.L, LA.A.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4

Design forecasting techniques to evaluate the results of altering natural systems. STL.13.M, MA.E.3.4, SC.G.2.4

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES--The student will be able to:

Service products to keep them in good operating condition. STL.19.L

Classify materials based on their qualities as natural, synthetic, or mixed. STL.19.M

Classify goods as durable goods designed to operate for a long period of time, or non-durable goods designed to operate for a short period of time. STL.19.N

Identify and classify manufacturing systems into types, such as customized production, batch production, and continuous production. STL.19.O

Discuss the interchangeability of parts to increase the effectiveness of manufacturing processes. STL.19.P

Identify chemical technologies providing a means for humans to alter or modify materials and to produce chemical products. STL.19.Q

Employ marketing techniques involving establishing a product's identity, conducting research on its potential, advertising it, distributing it, and selling it. STL.19.R

DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE CONSTRUCTION TECHNOLOGIES--The student will be able to:

Define infrastructure as the underlying base or basic framework of a system.

STL.20.J

Identify a variety of processes and procedures used in constructing structures.

STL.20.K

Identify requirements involved in the design of structures. STL.20.L

Recommend maintenance, alterations, or renovations to improve a structure or alter its intended use. STL.20.M

Identify prefabricated materials used in some structures. STL.20.N

DEMONSTRATE SAFE AND APPROPRIATE USE OF TOOLS AND MACHINES IN PRODUCTION TECHNOLOGY--The student will be able to:

Select appropriate tools, procedures, and/or equipment needed to produce a product.

Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to manufacture a product.

Follow laboratory safety rules and procedures.

Demonstrate good housekeeping at workstation within total laboratory.

Identify color-coding safety standards.

Explain fire prevention and safety precautions and practices for extinguishing fires.

Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

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

Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.

Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives. MA.B.3.4, MA.E.1.4

Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

Display an understanding of the efficient use of human resources.

DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The

student will be able to:

Define entrepreneurship.

Describe the importance of entrepreneurship to the American economy. SS.D.2.4

List the advantages and disadvantages of business ownership.

Identify the risks involved in ownership of a business.

Identify the necessary personal characteristics of a successful entrepreneur.

Identify the business skills needed to operate a small business efficiently and effectively.

UTILIZE MODERN PRODUCTION TECHNOLOGY IN THE PROCESSES OF SEPARATING, FORMING, COMBINING, FABRICATION, AND FINISHING OF MATERIALS--The student will be able to:

Design a program to be used in the separating forming and finishing of materials.

Develop and perform an operational program of forming materials.

Develop and perform an operational program of finishing materials.

Develop and perform an operational program that will use combination of modern production processes, equipment, and materials.

Produce a product using modern production technology.

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE DESIGNING AND ENGINEERING OF CONSTRUCTED WORKS--The student will be able to:

Develop construction plans using appropriate tools, symbols, and technical drawing techniques. LA.B.2.4

Describe building codes, permits, and inspection requirements.

Sketch and draw a plan for a construction project. MA.B.1.4, MA.B.4.4, MA.C.1.4, MA.C.3.4

Display knowledge about regional planning and the construction of civil and community projects (roads, parks, dams, airports, seaports, warehouses, shopping centers, factories, skyscrapers, etc.).

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE CONTRACTING, ESTIMATING, BIDDING, AND SCHEDULING PROCESSES--

The student will be able to:

Estimate construction costs using various methods. MA.A.4.4, MA.B.3.4

Read and prepare bid invitations for contractors to build a construction project.

LA.A.1.4, LA.A.2.4, LA.B.1.4, LA.B.2.4

Establish criteria for awarding a construction contract.

Develop a construction schedule.

Describe the content of a construction contract and performance bond. LA.A.2.4, LA.D.1.4

DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE CONSTRUCTION AND FINISHING OF STRUCTURES--The student will be able to:

Describe the properties of structures.

Use appropriate terminology associated with construction technology.

Identify and describe the materials used in the construction of superstructures.

Apply a variety of techniques, tools, materials, and processes in the construction of structures.

Apply technical knowledge and skills in the installation of utilities.

Apply technical knowledge and skills in the process of enclosing structures.

Apply technical knowledge and skills in the process of finishing the interior and exterior of a constructed structure.

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

Identify and research a design problem related to production technology.

LA.A.1.4, LA.A.2.4, SC.A.1.4, SC.D.2.4, SC.E.2.4, SC.H.1.4, SC.H.3.4

Produce a detailed design and plan for the production of the solution. MA.B.4.4, SC.E.2.4, SC.H.3.4

Complete the advanced design project as planned.

Deliver a professional quality presentation of the design process and solution.

LA.A.1.4, LA.A.2.4, LA.C.3.4

DEMONSTRATE AN UNDERSTANDING OF CAREER OPPORTUNITIES AND REQUIREMENTS IN THE FIELD OF PRODUCTION TECHNOLOGY--The student will be able to:

Discuss individual interests related to a career in production technology. LA.B.2.4

Explore career opportunities related to production technology. LA.A.1.4, LA.A.2.4, LA.B.2.4

Explore secondary education opportunities related to production technology. LA.A.1.4, LA.A.2.4, LA.B.2.4

Conduct a job search. LA.A.1.4, LA.A.2.4

Complete a job application form correctly. LA.B.2.4

Demonstrate competence in job interview techniques. LA.C.1.4, LA.C.3.4, LA.D.1.4

Create a professional resume and letter of introduction. LA.A.1.4, LA.A.2.4, LA.B.1.4, LA.B.2.4

Solicit awards, letters of recommendation and recognition. LA.A.1.4, LA.A.2.4,
LA.C.3.4, LA.D.1.4

Organize work samples in a professional, presentable format. LA.B.2.4, LA.C.3.4,
LA.D.1.4

Appendix B

Requirements for Braille Textbook Production

INSTRUCTIONS FOR PREPARING COMPUTER DISKETTES REQUIRED FOR AUTOMATED BRAILLE TEXTBOOK PRODUCTION

STATUTORY AUTHORIZATION

Section 233.0561(5), Florida Statutes, states that, "...any publisher of a textbook adopted pursuant to the state instructional materials adoption process shall furnish the Department of Education with a computer file in an electronic format specified by the Department at least 2 years in advance that is readily translatable to Braille and can be used for large print or speech access. Any textbook reproduced pursuant to the provisions of this subsection shall be purchased at a price equal to the price paid for the textbook as adopted. The Department of Education shall not reproduce textbooks obtained pursuant to this subsection in any manner that would generate revenues for the department from the use of such computer files or that would preclude the rightful payment of fees to the publisher for use of all or some portion of the textbook."

OBJECTIVE

Electronic text (etext) is needed to accelerate the production of textbooks in Braille and other accessible formats through the use of translation software. Some embedded publisher formatting commands help speed the conversion of English text to Braille or other accessible formats. Therefore, the objective of these instructions is to prompt publishers to provide textbook data in a format that will be useful to Braille and other accessible format producers while at the same time allowing each publisher the flexibility of using existing composition or typesetting systems. Publishers may produce etext files in one of three formats, as shown in the specifications below.

By April 1, 1998, publishers of adopted student textbooks for literary subjects must be able to provide the computer diskettes **UPON REQUEST**. Publishers shall provide nonliterary subjects when technology becomes available for the conversion of nonliterary materials to the appropriate format.

The requested computer diskettes shall be provided to the Florida Instructional Materials Center for the Visually Impaired (FIMC), 5002 North Lois Avenue, Tampa, Florida 33614; (813) 872-5281; in Florida WATS (800) 282-9193 or (813) 872-5284 (FAX). The center will contact each publisher of an adopted textbook and provide delivery instructions.

SPECIFICATIONS

1. **FORMAT (Three Options):**
 - a. A full implementation of Standard Generalized Markup Language (SGML).
 - b. XML-Extensible Markup Language
 - c. ASCII – (Last Resort!)

2. **OPERATING SYSTEM:** Windows

3. **DISKETTE SIZE:** 3.5, CD, Zip100

4. **DISKETTE CAPACITY:** Double-sided/high density

5. **DISKETTE LABELING:**
 - a. Sequential Number/ISBN
 - b. Book Title
 - c. File Name
 - d. Name of Publisher
 - e. Name of Typesetting Company/Contact Name
 - f. Format Option and Version
 - g. Copyright Date
 - h. Wording such as: “All rights reserved. As described in Chapter 233.0561(5), Florida Statutes, no use may be made of these diskettes other than the creating of a Braille, Large Print, or Recorded version of the materials contained on this diskette for students with visual impairments in the State of Florida.”

6. REQUIRED CONTENTS:

appropriate)

- a. Title Page
- b. List of Consultants and Reviewers (if appropriate)
- c. Table of Contents
- d. All Textbook Chapters
- e. All Appendices
- f. All Glossaries
- g. Indices

7. FILE STRUCTURE:
separate file.

Each chapter of a textbook will be formatted as a

8. FILE LIST:

A separate file listing the structure of the primary files must be provided. This file should be labeled DISKLIST TEXT. In addition, all special instructions (e.g., merging of materials kept in a separate file) should be noted in this file.

9. LOCATION OF SPECIAL DATA

Marginal notes, footnotes, captions, and other special items must be placed consistently within each text file.

10. CORRECTIONS AND CHANGES

A conscientious effort should be made to update files to exactly duplicate the adopted printed version of the textbook (including corrections and changes). If this cannot be accomplished in a timely and cost effective manner, the publisher will coordinate with the FIMC Supervisor and provide to the Supervisor one set of marked tearsheets of all corrections and changes not included in the files.