Name of Course: Communication Technology 1
Level of Course: Academic
Prerequisites: None
Grades Levels Offered to: 9 through 12
Course Number: 777
Number of Credits: 5
Length: Thirty Six Week curriculum / 180 days
Recommended class size: Maximum 18- *(Computer restrictions)*
Teacher Recommendation: One-Certified Technology Education Teacher or Industrial Arts Teacher
Revised Date and Teachers Names: Mr. Mark Wallace (August 2007)

Purpose:

Communication technologies provide the means for collecting and processing sending, receiving and storing information into forms that can be used by people. Communications is an essential element of any community's infrastructure-- in the business community it can be the factor that promotes growth or accentuates decline. In the 1980's, expanded use of the facsimile machine -- or "fax" -- and computer networks increased communication capabilities around the globe. These technology advances revolutionized the way the United States conducts business at home and abroad. The business climate of the 21st century will require even greater communications capabilities to meet the needs of business in the "information era."

Engineering is problem solving using tools called math and science. The study thereof provides the key that opens the door to solving some of the most exciting problems at hand in our society (Seymour). It should be noted that “tools” include mathematical knowledge, and software applications such as PowerPoint and spreadsheet, etc.. Using these tools helps to stimulate creativity and build self-confidence.

As the nation moves into the 21st century, new space communications systems will be required to meet the expanding needs of global telecommunications customers. In addition, the U.S. share of the communications satellite and equipment market has been shrinking since 1982 in the face of increased competition from European and Japanese companies. The Advanced Communications Technology Satellite (ACTS) Program is NASA's response to these competitive challenges of the future.

An introduction and understanding of communication technology is essential for all individuals. Knowing how to use a communication device is important, but understanding the input, process and outputs of communication technology will help in developing a technologically literate society.

Communication Technology 1,2,3, and 4 will be an interdisciplinary academic program fostering critical inquiry into the social, cultural, economic and political impacts of information and communication technologies. Activities and content areas in Communication Technology 1 include: electronic communications systems: Geographical Information Systems, Optics, Lasers and Telecommunications.

Method of Instruction:

Communications technology is an experienced-based course that studies systems that are used in a global society. Activities include the study of information/communication technology systems and the dynamics of the communication processes that occur between human-to-human, human-to-machine, and machine-to-machine. Students will use a variety of technology tools to engineer/create solutions to real-world problems in communications. This Communication Technology 1 course will provide students with knowledge of various areas of communication engineering through participation in problem solving and design activities.

Specific Behavioral Objectives and Timelines:
Current school structure: One day = One 42 minute period. Many units of study are woven together to simulate the real world.

Unit 1: Course Introduction and Safety Guidelines Time: 3 days/Ongoing
Goal:
- To introduce the students to the course expectations, discipline policy, and safety guidelines.

Objectives:
Students will be able to:
- Understand the course expectations and timeline for instruction.
- Understand the discipline policy that relates to behavior in this class.
- Outline the specific safety guidelines of the classroom and shop rules.

Unit #2: Introduction to Engineering/Design/Technology **Time: 3 Weeks/Ongoing**
Goal:
- Introduce the students to the systems of engineering, technology education and technological literacy.

Objectives:
Students will be able to:
- Define technology.
- Define engineering.
- List the various areas of engineering.
- Describe the difference between science, technology, and engineering.

- Describe technology as a system, and list and explain the components of these systems.
- Use various brainstorming techniques to generate ideas and solutions.
- Discuss the positive and negative impacts of different technological systems.
- Introduce the design loop and its impact on technological problem solving.
- Introduce the presentation technique of formal documentation.

Unit #3: Presentations Techniques **Time: 3 weeks/Ongoing/Interwoven**

Goal:

- To allow students to develop their ability to effectively communicate technological information and ideas through a variety of media.

Objectives:

Students will be able to:

- Create diagrams and sketches by hand and electronically to express design ideas and solutions.
- Create multi-media presentations to inform others about design concepts, products, and events.
- Create electronic databases and spreadsheets to gather, sort, analyze, and present data.
- Communicate orally and in writing the results of their design work.
- Create two and three-dimensional technical drawings by hand and electronically to develop and express design proposals.

Unit #4: Team-Work/Performance Time: 1 day/On Going

Goal:

- To have students understand and demonstrate the importance of good teamwork skills.

Objectives:

Students will be able to:

- Demonstrate effective skills for interaction with others
- Demonstrate the ability to work with people who are different from oneself
- Demonstrate a positive attitude about self
- Demonstrate skills in responding to criticism and providing constructive criticism to others
- Demonstrate an understanding of the importance of personal skills and attitudes towards job success
- Demonstrate positive work attitudes and behaviors

Unit #5: History of Communication Engineering **Time: 1 Week/Ongoing**

Goals:

- To acquaint the student with influences of communication systems engineering & communication technology in history.

Objectives:

- Students will develop an understanding of the cultural, social, economic, and political effects of engineering.

Unit #6: Introduction to Communication Systems

Goals:

- To know and understand the various systems which are invented in the information and communication technology field.
- To design and model a communication system.

Objectives: Students will:

- State the definition of communication
- Describe several ways in which people communicate.
- Define communication technology.
- Identify and give examples of fur types of communication systems.
- Diagram and explain the communication process.(Encoding, Transmitting, Receivng, Decoding)
- Cite and describe the four steps in the process for producing a message.
- Explain the difference between computer hardware and software.
- Understand the difference between Information and communication.

Unit #7: Models of Communication

Goals:

To Be Developed

Unit #8: Tool and Machine Safety **Time: 1 Week/Ongoing**

Goal:

- To introduce students to the safe and proper operation of hand tools and power machines so that they may fabricate solutions to engineering problems. In the process of using these tolls, the student will view automation and operator safety as significant engineering problems to brainstorm as well as the effect of gender or hand dominance on operations.

mwallace@hpregional.org

Objectives:
Students will be able to:

- Safely operate a band saw, scroll saw, drill press, disk and belt sander, brake, metal roller, shear, soldering gun, hand drill, etc.
- Safely use hand tools- claw hammer, screw driver, hand saw, coping saw, hack saw
- Read a metric and English ruler.

Unit #9: Electronic Systems: **Time: 10 Weeks**

Goal:

- Introduce the components, concepts, and principles associated with the electronic circuit design through lectures, software, and lab activities.

Objectives:

- Define Electronics.
- List several characteristics of alternating current.
- List several characteristics of direct current.
- Distinguish between the functions and practical applications of series and parallel circuits.
- Describe the difference between conductors and insulators.
- Define Ohm's Law.
- Define voltage; characteristics, units, and usage.
- Define current; characteristics, units, and usage.
- Define resistance; characteristics, units, and usage

Unit 10: Design and Development Activity: Electronic Communication **Time: 6 Weeks**

Goal:

- The students will apply their acquired knowledge in order to complete a comprehensive design and problem solving activity.

Objectives:

- Implement the steps in the design process.
- Utilize a variety of forms of presentation techniques.
- Apply acquired knowledge into the development of a working prototype.
- Implement the teamwork performance model to maximize group efficiency.
- Introduce a variety of different materials for usage and processing.

Unit #11: Optics, Photonics and Laser Technology **Time: 4 Weeks**

Goals:

- To understand what lasers are and how they work in a communication system.
- Be able to use a laser to communicate.

Objectives: *Students will*

- Understand the difference between light and laser light.
- Be able to diagram the parts and explain how a laser works.
- Know the various types of lasers.
- BE able to use optics to manipulate laser light
- Explain reflection, refraction, absorption and transparency.
- Understand how laser disks work
- Be able to make a hologram

Unit #12:GIS: **Time: 3 Weeks**

Goal:

- Gain an everyday sense of some of the components of a GIS
- Recognize GIS as a key geographic tool in seeing the world in spatial terms.
- Understand some kind of spatial data used in GIS.
- Recognize a GIS as providing a systematic way to understand aspects of the spatial organization of the earth's surface.
- Examine some aspects of using GIS in analysis and decision making.
- Explore the spatial context of an area known to them and use their personal geographic framework in the exploration.
- Recognize some of the interactions and connections between the earth's physical and human systems using the United States as a focus.
- Understand the concepts of GIS data layers, its connections to the earth's physical and human systems, and the appropriateness of the use of GIS in this kind of investigation.
- Learn a technique of organizing geographic information into maps for further analysis.

mwallace@hpregional.org

- Use their mapped output as a way of investigating geographical patters and generating geographic questions, hypotheses, and generalizations.
- Explore human geographical characteristics they might want as part of a GIS.
- Engage in personal decision making around possible future states of residence.
- Analyze the mental geographic databases they used in the process.
- Explore methods of creating and presenting geographic information.
- Give evidence of how personal characteristics and preferences may influence people's perceptions of place, regions, and the internal maps they carry.
- Consider how GIS would be useful in organizing, displaying and analyzing the geographic data.

Objectives:

- *Students will be able to:*
- Examine the concepts of GIS and the basic components of this increasingly important computerized geographic tool.
- Explore an application using the technology focused on U.S. Population distribution and some of the factors associated with these geographic patterns.
- Identify the basic components of a GIS (geography, data, a computer, and a thinking operator).
- Identify two virtues of using a GIS in decision-making (speed an flexibility).
- Construct a map using a written description.
- Demonstrate how geographic information affects decision-making.
- Identify some of the types of spatial data generally found in a GIS.
- Recognize some of the associations between various GIS data layers.
- Appreciate the inherent data input, updating, and expansion capabilities of GIS.
- Sketch a map of the neighborhood around the school from memory.
- Identify the relative location of geographic features in the neighborhood.
- Analyze differences/similarities between depictions of each other's mental map.
- Recognize patterns on interdependency among various geographic features.
- List some elements important to locating the site for a new service.
- Relate various aspects of their mental maps to basic GIS components
- Understand, at least in elemental fashion, how GIS enhances geographic analysis.
- Create quantile maps of state level data.
- Describe and suggest reasons for patterns of historic and contemporary human settlement/migration in the United States.
- Compare and contrast aspects of population distribution by areas of the country.
- Describe some physical processes that shape and forms in this country.
- List several ways in which technology and human intervention in the physical world have altered settlement patters in this country.
- Explain some of the relationships between population distribution and the natural world.
- Create quantile maps of state level data.
- Speculate about relationships between data they have mapped and data the have not seen.
- Generate a list of specific data items they would want to use in the further research and potentially seek out these data sets.
- Create Graphic data
- Quantify, map, and analyze information contained in personal mental maps.
- Speculate on other data useful in further research.
- Develop and test geographic generalizations.

Assessment:

The assessment of student progress in the objectives cited on the previous pages will be primarily by, but not limited to, the following criteria.

Design Portfolios & Presentations	40%
Homework	10%
Tests	20%
Class Participation/Code of Conduct	20%
Knowledge Logs/Notebooks	10%

Homework, Extra Credit Policy:
Due to the periodic nature of homework in this course, homework will not be accepted late unless a legitimate excuse exists. Extra credit will be available during the design and problem solving activities in the form of additional research/development and competitive events.

mwallace@hpregional.org

Special Course Policies:
Success in this course will be based on a variety of factors, however the instructor will most directly assess the student's performance in comprehensive design and problem solving activities, teamwork performance, and class participation as the means of determining a grade. A typical week in class will consist of formal instruction on a variety of material, students working in groups to complete work pertaining to the lecture, research and development, teamwork to generate possible solutions to and solve problems, and in some cases the development of different products and prototypes. Quizzes and tests will be given to re-emphasize and assess the student's understanding of the presented information.

mwallace@hpregional.org