Electronic Communications (40-assignment)

This is an integrated instructional module designed specifically to operate within a Modular Program environment. It is ideal for use with our Scantek Technology or IT2020 Information Technology programs. It includes a 10-assignment exploratory curriculum and a further 30-assignment in-depth curriculum. The exploratory curriculum and the in-depth curriculum are each split into two parts. Each part includes a pre-test and post test. Where appropriate, the module includes hardware, software and curriculum materials sufficient to provide a complete learning experience.

The curriculum incorporates continuous assessment through questions. When used in conjunction with a ClassAct networked management system, this provides instant feedback of student performance. The assessments begin with a comprehensive pre-test. This quiz includes questions for each subsequent assignment, together with questions that will specifically test math and reading ability.

Every assignment starts with a series of questions designed to track inventory. These ensure that any missing items are located before they are needed.

Each assignment is divided into a series of tasks. Hands-on tasks form the core of the student work. Where appropriate, these are accompanied by research tasks based upon illustrated text and on-screen applications. Assessment questions are incorporated into each task.

Typical 10-assignment topic areas include:
- Radio wave communication
- Light as a line-of-sight transmission
- Messages across a microwave link
- Radio wave communication
- Electromagnetic spectrum
- Omnidirectional and unidirectional transmission
- Basic properties of microwaves
- Penetration properties of microwaves
- Radar object detection
- Satellites

Typical 10-assignment activities include:
- Explore a string based communication system.
- Recognize sound as a vibration.
- Use light communication to discover line of sight.
- Demonstrate the advantages of using radio waves for communication.
- Describe the basic process of radio communication.
- Use a microwave system to send voice messages.
- Identify the function of the parts in a microwave communication system.
- Identify the difference between omni-directional and unidirectional transmission.
- Recognize how antenna type determines transmission direction.
- Investigate wire based communication systems.
- Recognize how the environment affects the transmission of microwaves.
- Identify the penetration properties of microwaves.
- Demonstrate a transverse wave.
- Identify different terms relating to waves.
- Relate microwaves to the electromagnetic spectrum.

Typical 10-assignment activities include (continued):
- Investigate laser, sonar and radar technology.
- Demonstrate the principle of radar for detecting objects.

Typical 30-assignment topic areas include:
- Signed language
- Early communications
- Line of sight and range
- Coding systems and semaphore
- Signal strength and distance
- Planning a communication system
- Morse code
- Wave reflection and refraction
- Microwave line of sight transmission
- Connections and networks
- Call charges
- The history of the telephone
- The fax machine
- Digitizing pictures
- Mobile phones
- Network switches and call routers
- The electromagnetic spectrum
- Wavelength, amplitude and frequency
- Signal bandwidth
- Multiplexing and de-multiplexing
- The ionosphere
- Polarization
- Satellite technology
- Radar echo calculation
- Air traffic control
- Binary values
- ASCII
- The World Wide Web
- Internet, modem operation and email transmission
- File transfer
- Creating web pages
- Microwave links
- Microwave transmission and obstruction
- Cost and environmental impact considerations of implementing communications links

Typical 30-assignment activities include:
- Define advantages and disadvantages of various transport methods.
- Use walkie-talkies as a method of communication.
- Interpret sign language.
- Connect the computer to the Microwaves Communication board.
- Identify old communication systems.
- Describe problems with line of sight communications.
- Complete an elevation diagram to prove line of sight theories.
- Use various methods of communicating at sea.
- Identify how range affects line of sight communication.
- Show how microwaves work by line of sight.
- Calculate distances using trigonometry.
- Show how line of sight can be affected by the curvature of the Earth.

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Typical 30-assignment activities include (continued):
- Produce Morse code over a microwave system.
- Interpret Morse code signals.
- Show modern applications of Morse code using walkie-talkies.
- Show a communication system to include a transmitter and a receiver.
- Identify one-way and two-way communication systems.
- Use microwaves as a communication link.
- Produce a company logo following verbal commands.
- Identify the history of the fax machine.
- Use the microwave system as a fax machine.
- Describe the scanning process implemented by a fax machine.
- Identify the system used by cellular phones.
- Show how cell to cell communications work with cellular phones.
- Identify why cell phones require a base station.
- Define facts about cellular phone networks.
- Identify different terms relating to waves.
- Relate microwaves to the electromagnetic spectrum.
- Experiment with the wavelength of a microwave signal.
- Define bandwidths and channels of communication.
- Show how noise affects a transmitted signal.
- Distinguish between reflected and refracted waves.
- Show how television pictures are constructed.
- Use the microwave system as a television link.
- Use a radar simulation to show an application of microwaves.
- Demonstrate the principles of radar using the microwaves board.
- Use CAI to review the radar system.
- Predict the flight path of aircraft using polar coordinates.
- Show how signals are passed by a modem.
- Identify how signal errors are caused on a communication link.
- Convert decimal to binary numbers.
- Demonstrate binary code transmission using a modem simulation.
- Use the ASCII code table to decode binary codes.
- Follow a conversion process for decimal to binary conversion.
- Use search tools on a simulation of the Internet.
- Identify various types of computer crime.
- Identify how files are transferred on the Internet.
- Describe aspects of computer viruses.
- Create a page for a Web site.

Typical 30-assignment activities include (continued):
- Add the page to the Internet simulation.
- Identify how transmitted pulse and received echo times are used in radar calculations.
- Evaluate the cost of implementing various communication links.
- Relate the implementation of various communication links to the impact on the community and environment.
- Plan sites for a microwave communication system.

Each assignment is designed around a list of performance objectives. These lists include academic, technical and occupational objectives. The assignments are written in such a way as to enable a student to attain the performance objectives, with the assessment questions linked to these in order to provide a measure of true competency.

The performance objectives are used by the ClassAct management system to generate a comprehensive portfolio of student competency reports. Default reports supplied with this module include:
- Entry report
- Technical/Occupational Exit report
- Basic Skills report based upon the federal SCAN's report.

The items supplied with this instructional module include:
- 10-assignment On-Screen Student Assignment Guide CD
- 10-assignment Student Assignment Guide
- 10-assignment Student Workbook
- 10-assignment Instructor's Guide
- 30-assignment Student Assignment Guide
- 30-assignment Student Workbook
- 30-assignment Instructor's Guide
- Computer Aided Instruction Software
- Teletek 2000 Programs
- On-line Fact File
- Electronic Communications Glossary
- Walkie-talkies
- Microwave Communications Base board
- Microwave Transmitter
- Microwave Receiver
- Polarizing grill
- Electronic Communications Accessory Kit
- Data Transmission Interface

Additional items required:
- Computer

Module Facts

For Technology Program, order as:
ST200/40 Electronic Communications

For IT Program, order as:
NS4C Electronic Communications

	No.	Average time
Assignments	40	45 minutes
Extension Activities	4	45 minutes
Total		33 hours

LJ Technical Systems
Web site: www.ljgroup.com