TECHNOLOGY EDUCATION
GRAPHIC COMMUNICATIONS

GRADES 9-12
FOUNDATION COURSE
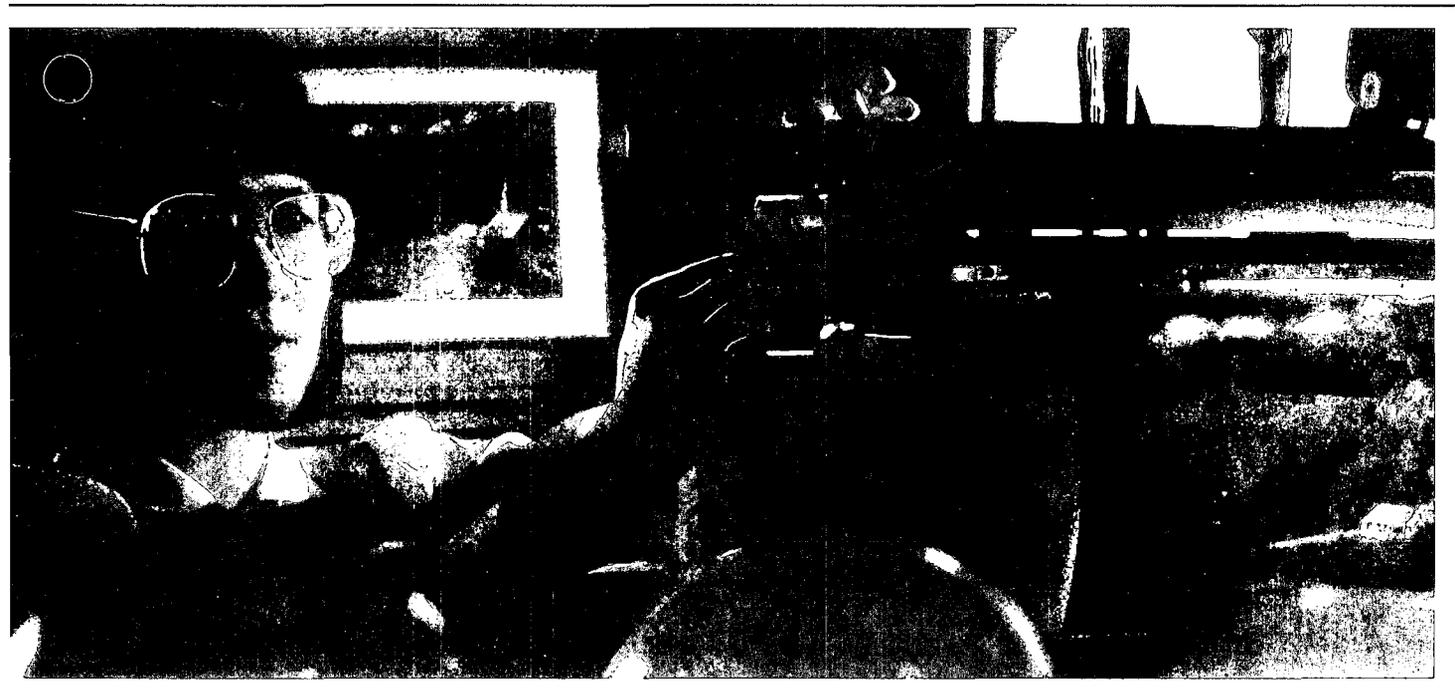
Cover Photograph Courtesy of:
Xerox Corporation

OVERVIEW AND RATIONALE

Graphic Communications introduces the processes of the printing and publishing industry. The graphics industry continues to grow in its production capacity and competitive environment. It ships over 200 billion dollars worth of products and is projected to employ 3.5 million people by the year 2000. Its reliance on sophisticated electronic processes brings about a constant rate of re-tooling and training, with employers dedicating fifteen days of training per year per employee. Printing technology continues to evolve as a highly computerized field, with imaging science as the driving force throughout the manufacture of its products.

Graphics communications technology consists of modules in the areas of image design, computer technology, pre-press processes, image transfer and finishing. It requires a laboratory where students have access to computer and graphic equipment. Hands-on learning accounts for 75 percent of instructional time in the processes studied in all modules.

This course serves a foundation for the study of processes included in Communication Systems and Media Foundations. It is part of the sequence in Technology Education and is one of the five half-unit courses that have been identified as Foundation courses: Material Processes, Electricity/Electronics, Energy/Power, Technical Drawing and Graphic Communications.

USE IN SEQUENCE: **Foundation course**

This course is one of the New York State approved Foundation courses in Technology Education. It is one of seven courses designed to give students a firm but broad exploration of the technical world in which they live. Students completing a sequence in Technology Education must have successfully completed any two of these seven Foundation courses.

This course may also be taken by any student as an elective. If the instructor uses this syllabus as a guide for instruction, students may be granted Regents credit for the experience.

Several courses within Technology Education offerings can be offered on a 1/2-unit or 1-unit basis. Course work earning 1/2-unit must comprise a minimum of 54 hours of instruction and course work earning 1-unit must comprise a minimum of 108 hours of instructional time.

Students with Disabilities

The Board of Regents, through the part 100 Regulations of the Commissioner, the Action Plan, and The Compact for Learning, has made a strong commitment to integrating the education of students with disabilities into the total school program. According to Section 100.2(s) of the Regulations of the Commissioner of Education, "Each student with a handicapping condition as such term is defined in Section 200.1(ii) of this Chapter, shall have access to the full range of programs and services set forth in this Part to the extent that such programs and services are appropriate to such student's special educational needs." Districts must have policies and procedures in place to make sure that students with disabilities have equal opportunities to access diploma credits, courses, and requirements.

The majority of students with disabilities have the intellectual potential to master the curricula content requirements for a high school diploma. Most students who require special education attend regular education classes in conjunction with specialized instruction and/or related services. These students must attain the same academic standards as their nondisabled peers to meet graduation requirements, and, therefore, must receive instruction in the same content areas, at all grade levels. This will ensure that they have the same informational base necessary to pass statewide testing programs and meet diploma requirements.

Teachers certified in the subject area should become aware of the needs of students with disabilities who are participating in their classes. Instructional techniques and materials must be modified to the extent appropriate to provide students with disabilities the opportunity to meet diploma requirements. Information or assistance is available through special education teachers, administrators, the Committee on Special Education (CSE) or student's Individualized Education Program (IEP).

Strategies for Modifying Instructional Techniques and Materials

1. Students with disabilities may use alternative testing techniques. The needed testing modification must be identified in the student's Individualized Education Program (IEP). Both special and regular education teachers need to work in close cooperation so that the testing modifications can be used consistently throughout the student's program.

2. Identify, define and pre-teach key vocabulary. Many terms in this syllabus are specific and some students with disabilities will need continuous reinforcement to learn them. It would be helpful to provide a list of these key words to the special education teacher in order to provide additional reinforcement in the special educational setting.

3. Assign a partner for the duration of a unit to a student as an additional resource to facilitate clarification of daily assignments, timelines for assignments, and access to daily class notes.

4. When assigning long-term projects or reports, provide a timeline with benchmarks as indicators for completion of major sections. Students who have difficulty with organizational skills and time sequence may need to see completion of sections to maintain the organization of a lengthy project or report.

Infusing Awareness of Persons with Disabilities Through Curriculum

In keeping with the concept of integration, the following subgoal of the Action plan was established.

In all subject areas, revisions in the syllabi will include materials and activities related to generic subgoals such as problem solving, reasoning skills, speaking, capacity to search for information, the use of libraries and increasing student awareness of and information about the disabled.

The purpose of this subgoal is to ensure that appropriate activities and materials are available to increase student awareness of disabilities.

This curriculum, by design, includes information, activities, and materials regarding persons with disabilities. Teachers are encouraged to include other examples as may be appropriate to their classroom or the situation at hand.

STUDENT LEADERSHIP SKILLS

Development of leadership skills is an integral Part of occupational education in New York State. The New York State Education Department states that, "Each education agency should provide to every student the opportunity to participate in student leadership development activities. All occupational education students should be provided the opportunity to participate in the educational activities of the student organization(s) which most directly relate(s) to their chosen educational program."

Leadership skills should be incorporated in the New York State occupational education curricula to assist students to become better citizens with positive qualities and attitudes. Each individual should develop skills in communications, decision making/problem solving, human relations, management, and motivational techniques.

Leadership skills may be incorporated into the curricula as competencies (Performance Objectives) to be developed by every student or included within the Suggested Instructional Strategies. Teachers providing instruction through occupational educational curricula should familiarize themselves with the competencies. Assistance may be requested from the State advisor of the occupational student organization related to the program area.

Students who elect to become active members of one of the student leadership organizations chartered by the New York State Education Department have the advantage of the practical forum to practice leadership skills in an action oriented format and have the potential for recognition of their achievements at the local, State, and national level.

SYLLABUS OBJECTIVES

Through the implementation of this syllabus, the student will be able to:

1. Understand and demonstrate skill in image design, computer technology, pre-press processes, image transfer and finishing.

2. Use computer systems and software tools to design and implement Graphic Communications.

3. Understand and be sensitive to concerns and issues confronting the graphic communications industry.

4. Use graphic communications equipment safely and effectively.

5. Successfully complete further study in related communication technology and media production course work.

PERFORMANCE OBJECTIVES

The performance objectives of the syllabus are intended to clearly present what students are expected to know, do and be like, following instruction in a given topic. The knowledge (K), skills (S) and attitudes (A) that students should acquire are identified for each topic, under "competencies to be developed".

SYLLABUS OUTLINE
Table of Contents

CONTENT OUTLINE

I. Module: **Preparation for Graphic Reproduction**
- A. Topic: **Measurement**
  - 1. Metric System
    - a. Length and width
    - b. Volume
    - c. Temperature

  - 2. Printers system of measure
    - a. Typographic
    - b. Layout
    - c. Material weight and size

- B. Topic: **Design Foundations**
  - 1. Typography
    - a. Type classification
    - b. Letter spacing, word spacing and alignment
    - c. Headline and body composition
    - d. Copyfitting

  - 2. Design Elements or principles
    - a. Lines, shape and mass
    - b. Balance, dominance, proportion and unity
    - c. Contrast and rhythm
    - d. Texture and color

  - 3. Layout/Design steps
    - a. Thumbnail
    - b. Rough
    - c. Comprehensive
    - d. Mechanical
    - e. Dummy

II. Module: **Electronic Imaging/Desktop Publishing**
- A. Topic: **Microcomputer Imaging System**
  - 1. Hardware
    - a. Central processing unit and memory
    - b. Keyboard, mouse and digital tablet
    - c. Disk and tape storage
    - d. Dot matrix, ink-jet and laser image printers
    - e. Line, halftone, gray scale and OCR scanning

f. Image capture devices

g. Printer network and file serving operations

h. Safety considerations

2. Software applications for graphic production
   a. Word processing
   b. Drawing
   c. Painting
   d. Illustrating
   e. Text and graphic integration

B. Topic: **Computer Training**
   1. The user/system interface
      a. Menu and cursor control
      b. Floppy and hard disk procedures
      c. File and file folder procedures

   2. Word processing/typesetting
      a. Type and font selection
      b. Word and letter spacing
      c. Left, right and justified alignment
      d. Tabs and indents
      e. Spell check and proofing

   3. Drawing and illustrating
      a. Manual and auto draw procedures
      b. Ruling, tinting and filling
      c. Surprinting and reversing
      d. Object manipulation
         (1) duplicating
         (2) stretching
         (3) resizing
         (4) moving
      e. Exporting files

   4. Analog and digital imaging
      a. Video digitizers and image capture devices
      b. Scanners -- line, halftone and gray scale

5. Integrating text and graphics
    a. Importing files
    b. Placing graphics
    c. Flowing text
    d. Page editing

6. Image output
    a. Printer network
    b. Choosing printers
    c. Print menus and options
    d. Printer operation

C. Topic: **Telecommunications**
    1. Land and satellite systems
        a. System overview
        b. Communication software and hardware

    2. Communication procedures
        a. Preparing files for transfer
        b. Setting up a communication session
        c. Sending and receiving files

    3. Applications
        a. Electronic mail
        b. FAX
        c. Service bureau communication

III. Module: **Graphic Imaging/Pre-press**
    A. Topic: **Mechanical Preparation**
        1. Working with photographs and illustrations
            a. Cropping and scaling
            b. Resizing
            c. Windows and holding lines

        2. The paste-up
            a. Layout tools, supplies and equipment
            b. Layout lines and work marks
            c. Attaching copy
            d. Multicolor -- overlays and register marks

B. Topic: **Line and Tone Reproduction**
   1. Film characteristics
      a. Nature of light
      b. Color sensitivity, contrast and film speed
      c. Structure of film

   2. Camera fundamentals
      a. Camera types
      b. Loading copy and film
      c. Exposure control
      d. Camera accessories

   3. Line, halftone and continuous tone imaging
      a. Contacting
      b. Projection printing by enlarger
      c. Line photography
      d. Halftone photography

   4. Chemical processing
      a. Processing steps
      b. Tray and machine processing
      c. High contrast, rapid access and continuous tone
      d. Image evaluation
      e. Safety considerations

C. Topic: **Image Carrier Preparation**
   1. Film assembly
      a. Tools, supplies and equipment
      b. Masking sheet layout
      c. Attaching film images
      d. Registration and alignment

   2. Plate and stencil making
      a. Equipment and supplies
      b. Offset plates
      c. Screen stencils
      d. Plate and stencil processing and finishing
      e. Safety considerations

D. Topic: **Pigments and Substrates**
   1. Pigments
         a. Properties
         b. Ingredients
         c. Ink types

   2. Substrates
         a. Book paper
         b. Writing paper
         c. Cover paper
         d. Bristol paper
         e. Other

IV. Module: **Image Reproduction/Printing**
   A. Topic: **Printing Systems**
      1. Basic processes
            a. Lithography
            b. Flexography
            c. Gravure
            d. Screen

      2. Other reproduction processes
            a. Xerographic
            b. Laser
            c. Ink-jet

      3. Image transfer
            a. Feeder unit: loading and controlling
            b. Registration unit: types and adjustments
            c. Printing unit: configuration and adjustments
            d. Ink, pigment or toner unit: set-up and adjustments
            e. Dampening unit: preparation and adjustments
            f. Delivery unit: adjusting and controlling
            g. Safety considerations

      4. Press configurations
            a. Sheet-fed and web-fed
            b. Single and multicolor
            c. Perfecting

B. Topic: **Finishing Operations**
    1. Cutting and trimming
        a. Safety considerations
        b. Cutter operation
        c. Sequence of cuts

    2. Folding
        a. Machine operation
        b. Types of folds
        c. Sequence of folds

    3. Special operations
        a. Scoring
        b. Slitting
        c. Perforating
        d. Die cutting

    4. Assembling
        a. Manual and automatic
        b. Gathering, collating and inserting

    5. Binding
        a. Padding
        b. Side and saddle binding
        c. Perfect and casebound

V. Module: **Industry Related Concerns**
  A. Topic: **Industrial Organization and Careers**
    1. Industrial organization
        a. Segments/classifications of industrial services
        b. Types of printing establishments and communications enterprises

    2. Graphic communications center
        a. Personnel organization
        b. Career planning

  B. Topic: **Emerging Technologies and Impacts**
    1. Emerging technologies
        a. Electronic imaging
        b. Reproduction processes

2. Outcomes of graphic communications
   a. Social impacts of mass communications
   b. Ecological impacts of graphic processes

C. Topic: **Legal Considerations**
   1. Copyright and trademark
      a. Author and designer rights
      b. Printer obligations

   2. Ethics in communications
      a. Model release
      b. Libel, plagiarism and counterfeiting
      c. Privacy, freedom of information, freedom of expression and censorship

SYLLABUS COMPONENT

I. Module: **Preparation for Graphic Reproduction**
    A.   Topic: **Measurement**
        1.   **Performance Statement:**

Upon satisfactory completion of this topic, the student will:

- measure length, width, volume and temperature of graphic arts materials and supplies, using metric measurement devices;
- state the purpose of measurement tools and use them correctly.

Competencies to be Developed:

After studying this topic, the student will be able to:

    a.   Identify photographic film sizes in millimeters and measure the temperature of photographic chemicals in degrees Celsius. (S) (K)

    b.   Measure liquid quantities in liters and milliliters. (S) (K)

    c.   Describe the point system of measurement and use a line gauge. (K) (S)

    d.   Use a proportion wheel to calculate percentages of enlargement and reduction. (K) (S)

    e.   Identify paper weights and sheet sizes used for printed products. (K)

Suggested Instructional Strategies:

1.   Show examples of metric sizes of graphic arts materials, software page set-up commands in metric, et cetera.

2.   Have students use a metric rule to measure standard sheet sizes, 35mm film, et cetera, measure liquid quantities in liters and milliliters, and measure the temperature of photographic chemicals in degrees Celsius and compare with Fahrenheit temperatures.

3.   Describe the point system of measurement and demonstrate use of a line gauge. In existing publications, have students measure column widths in pica and type in points.

4.   Demonstrate use of a proportion wheel to calculate percentage of enlargement and reduction. Have students solve enlargement and reduction problems on a worksheet.

5. Demonstrate use of a screen angle and ruling gauge to measure halftone screens and lines/dots per inch.

6. Demonstrate use of a densitometer to determine film and image density.

7. Have students solve a worksheet problem to calculate press time, number of impressions per hour and quantity estimates.

B. Topic: **Design Foundations**
1. **Performance Statement:**
Upon satisfactory completion of this topic, the student will:

- demonstrate and describe typography and describe its classifications, fonts and composition;
- demonstrate and describe effective design practices;
- demonstrate and describe the sequence of layout and design steps.

Competencies to be Developed:
After studying this topic, the student will be able to:
 a. List and describe the classifications of type and associate them with appropriate usage. (K)
 b. Describe character and word spacing solutions. (K)
 c. Identify the differences between headlines and body composition. (K)
 d. Identify design elements and principles in graphic design examples. (K)
 e. Demonstrate the principles of balance, dominance, proportion and unity in the preparation of thumbnail and rough layouts. (S) (K)
 f. Describe the impact and expense of color graphics. (K)
 g. Prepare thumbnail sketches and roughs of design proposals, comprehensives for selected technology learning activities, camera ready mechanicals demonstrating correct paste-up techniques and a dummy of a multipage document. (S) (K)

Suggested Instructional Strategies:

1. Present an audiovisual program about typography.

2. Have students identify typefaces in sample publications by referring to a font style sheet.

3. Have students identify align left, align center, align right and justified spacing in body composition in sample publications.

4. Develop a worksheet to calculate character, word and line counts for copyfitting.

5. Coordinate a class design activity, with the teacher playing the role of the printing customer and the class serving as a team of artists in a design studio/ad agency.

6. Show an audiovisual presentation that identifies design elements and principles. Follow up with a demonstration and discussion of existing graphic design examples. Have students identify the design principles that have been used or ignored in the examples.

7. Develop a hands-on graphics assignment for publication and help students apply elements of design to the message planning stage.

8. Have students prepare thumbnail sketches and roughs of design proposals for teacher approval, and comprehensives for selected technology learning activities.

9. Have students prepare camera-ready mechanicals demonstrating correct paste-up techniques.

II. Module: **Electronic Imaging/Desktop Publishing**

A. Topic: **Microcomputer Imaging System**
    1. **Performance Statement:**
Upon satisfactory completion of this topic, the student will describe and identify the components of a microcomputer imaging system and its peripheral devices, and list and describe the software applications for graphic production.

Competencies to be Developed:

After studying this topic, the student will be able to:

    a.   Define central processing unit and type of memory. (K)

    b.   Compare keyboard, mouse, digital tablet and other input devices. (K)

    c.   Describe data storage, back-up and retrieval systems and the importance of back-up. (K)

    d.   Define and compare dot matrix, ink-jet, laser and photo image printers. (K)

    e.   Define scanning and describe formats including bi-level, halftone, grey scale and OCR. (K)

    f.   Describe the technology of image capture and the devices used to import graphic images. (K)

    g.   Describe printer networks and file serving/sharing systems. (K)

    h.   Describe representative applications of word processing software, drawing software, painting software, illustration software, and text and graphic integration/page layout software, and state their overall functions and role in graphic communications. (K)

Suggested Instructional Strategies

1.   Show an audiovisual presentation about components of computer systems. Define central processing unit and types of memory.

2.   Have students collect advertisements and articles from magazines that feature computer components. Lead a class discussion and prepare a visual display. Include input devices, data storage, back-up and retrieval systems, page displays, monitors and projection systems.

3.   Provide for discussion and sampling, various printed samples of dot matrix, ink-jet, laser and photo image printers.

4.   Demonstrate scanning and describe formats; demonstrate image capture and the devices used to import graphic images; and demonstrate and describe modems and their function.

5.	Demonstrate and describe representative word processing, drawing, painting, illustration, and text and graphic integration/page layout software applications. State their overall functions and role in graphic communications.

B.	Topic: **Computer Training**
	1.	**Performance Statement:**
	Upon satisfactory completion of this topic, the student will:

	•	operate the user/system interface of a microcomputer imaging system and its peripheral devices;
	•	perform the following operations on a microcomputer imaging system: word processing/typesetting; drawing and illustrating; analog and digital imaging; text and graphic integration; and image output/printing.

	Competencies to be Developed:
	After studying this topic, the students will be able to:
	a.	Perform cursor and menus commands; floppy, hard disk and storage media start-up and shut down procedures; and file management, file saving and folder set-up procedures. (S) (K)
	b.	Select type size and font specifications; format left, right and justified alignment; engage tabs and indents; and operate spell check applications and features. (S) (K)
	c.	Execute manual and auto draw procedures; perform ruling, tinting and pattern filling functions and surprinting and reversing effects; manipulate objects through duplicating, stretching, resizing and moving; and prepare files for exporting to other operations. (S) (K)
	d.	Set up video digitizers and image capture devices, and set up and operate optical scanning devices. (S) (K)
	e.	Perform page set-up commands; perform place commands for graphic and text; manipulate text and graphics; and perform editing functions. (S) (K)
	f.	Operate the printer network; identify and select destination printer; perform print commands and option controls; and describe the overall operation of printers and imaging devices. (S) (K)

Suggested Instructional Strategies:

1. In a computer training facility, with students having access to individual computers or in student teams, demonstrate and require hands-on activities. In this initial training stage, cover basic cursor and menu commands, floppy, hard disk and storage media start-up and shut-down procedures, file management, file saving and folder set-up procedures, file opening, document opening and application launch procedures.

2. Generate a basic typesetting exercise that students can complete on the computer. Include type size and font specifications; word and letter spacing; left, right and justified alignment; tabs and indents; and spell check applications. Have students submit their printed images for evaluation.

3. Prepare a basic drawing experience that students can complete on the computer. On selected software, the activities should include manual and auto-draw procedures; ruling, tinting and pattern filling functions; surprinting and reversing effects; duplicating, stretching, resizing and moving and preparing files for exporting to other applications.

4. Prepare a digitizing experience that students can complete on the computer. With software and peripherals, the activities should include set-up of video digitizers and image capture devices, operation of optical scanning devices and enhancement and manipulation of digitized images.

5. Prepare a basic page layout/desktop publishing experience that students can complete on the computer. Include page set-up commands, importing files from other software applications, place commands for graphics and text, how to manipulate text and graphics, and editing functions. Use tutorial packages that accompany the software or custom design a publication.

6. Prepare a basic overview and demonstration of the operation of the printer network, selection of the destination printer, print commands and option controls, overall operation of printers and imaging devices and printer maintenance routines.

C. Topic: **Telecommunications**

1. **Performance Statement:**

Upon satisfactory completion of this topic, the student will describe and perform telecommunications operations on a microcomputer imaging system, and describe the role and industrial applications of telecommunications operations.

Competencies to be Developed:

After studying this topic, the student will be able to:

    a.   Describe land and satellite telecommunications systems. (K)

    b.   List and describe hardware and software requirements for telecommunications. (K)

    c.   Prepare, send and receive files for telecommunications, and perform on-line, interactive communication sessions. (K) (S)

    d.   Describe electronic mail and information systems. (K)

    e.   Describe the purpose and usage of image transmission (FAX) systems. (K)

    f.   Describe the role of service bureaus for remote typesetting operations. (K)

Suggested Instructional Strategies:

1. Demonstrate and describe representative telecommunications software applications, overall functions and role in graphic communications.

2. Prepare a basic telecommunications experience that students can complete on the computer. After describing land and satellite telecommunications systems, electronic mail and hardware and software requirements for telecommunications systems, initiate in-lab communication sessions between two computers. Have students prepare files for telecommunications and then send and receive files during interactive communication sessions.

3. Show examples of electronic mail, facsimile machines and output of service bureaus. Obtain samples from an area service bureau and show file preparation requirements outlined by the company.

III. **Module:** **Graphic Imaging/Pre-press**
    A.   Topic: **Mechanical Preparation**
        1.   **Performance Statement:**

Upon satisfactory completion of this topic, the student will crop away unwanted portions and scale the image to fit a window or an area on a mechanical; and select and use tools and materials to prepare a single or multi-color camera-ready paste-up with appropriate production work marks.

Competencies to be Developed:

After studying this topic, the student will be able to:

    a.   List the guidelines of good composition. (K)
    b.   Define the terms cropping and scaling. (K)
    c.   Use cropping L's and a proportion calculator. (S)
    d.   Place windows and holding lines onto a mechanical. (S)
    e.   Identify layout tools, supplies and equipment for producing camera-ready copy. (K)
    f.   Make layout lines and work marks on camera-ready copy. (S)
    g.   Use appropriate adhesives for attaching copy to paste-ups. (K) (S)
    h.   Prepare single and multi-color mechanicals using overlays with register marks. (S)

Suggested Instructional Strategies:

1.   Show a video about photographic composition.

2.   Demonstrate how to crop and scale a photograph or illustration to fit a window or an area on a mechanical. Make cropping L's and proportion calculators available for use on student projects.

3.   Demonstrate the process of placing windows and holding lines on a mechanical using hand techniques and computer applications.

4.   Involve students in a graphic activity requiring the use of type, picture and line illustrations.

5.   Provide supplies for producing camera-ready copy. Demonstrate the use and layout of tools and equipment and the importance of work marks on camera-ready copy.

16

6.   Provide and demonstrate the adhesive method of attaching copy to a mechanical.

7.   Prepare single and multi-color mechanicals using overlays with register marks.

B.   Topic: **Line and Tone Reproduction**
1.   **Performance Statement:**

Upon satisfactory completion of this topic the student will discuss film characteristics and structure; expose a line negative using a graphic arts camera; tray process a line negative; and discuss the differences in, and evaluate, line and halftone images.

Competencies to be Developed:

After studying this topic, the student will be able to:
a.   Explain the nature of the visible spectrum, describe the differences between normal 35mm and graphic arts high contrast film, and sketch the structure of film. (K) (S)
b.   Set an f/stop and shutter speed that will produce a proper exposure on film. (K) (S)
c.   Mount copy on and set the enlargement/reduction scales of a graphic arts camera. (K) (S)
d.   Set up a darkroom sink with appropriate amounts of film processing chemicals. (K) (S)
e.   List the processing times and temperatures for developing, stopping, fixing and water washing. (K)
f.   Explain the differences between tray and machine processing. (K)
g.   Discuss the types of films and developers used in the graphic communications industry. (K)
h.   Explain the procedure for removing chemicals from the human eye. (K)
i.   Explain the differences in exposure requirements and the differences in processing procedures, and identify a properly exposed and processed negative. (K) (S)

Suggested Instructional Strategies:

1.   Show a video about graphic arts photography. Present visuals about the visible spectrum and relate wave length information to film sensitivity -- such as the difference between continuous tone film and high contrast film.

2.　　Explain the structure of film. On an overhead projector, scratch the emulsion side to show the difference in color between the emulsion side and the plastic or antihalation side. Explain why the film is exposed through the emulsion side.

3.　　Give a live demonstration of camera set-up. In teams of two or three, have students set the lens and shutter to make a line exposure. Have them mount copy and set the camera for a 100 percent and expose a sheet of film.

4.　　Show a video about line photography. Discuss the theory of film processing and tray and machine processes used in the graphic arts industry.

5.　　Demonstrate the laboratory procedure for processing a line negative. Demonstrate the procedure for evaluating a line and halftone negative. Have teams of students process their exposed line negative.

6.　　Show a video about halftone photography. Lead a class discussion about halftones and how they differ in books, newspapers and magazines.

7.　　Give a live halftone photography demonstration. Explain the need for more than one exposure.

8.　　Calibrate the laboratory camera for halftone photography and post the main and flash exposure so any student can add halftones to their graphic product.

C.　Topic: **Image Carrier Preparation**
1.　　**Performance Statement:**
Upon satisfactory completion of this topic, the student will select tools, materials and equipment to prepare a flat by attaching film images to a masking sheet; prepare a screen image carrier by attaching screen fabric to a frame; and prepare offset plates and screen printing stencils for image transfer.

Competencies to be Developed:
After studying this topic, the student will be able to:
　　　a.　Identify tools, supplies and equipment for the stripping process. (K)

      b.   Position a film image onto a masking sheet for proper plate position. (S)

      c.   Properly expose offset plates and screen stencils on an exposure device. (S)

      d.   Process and finish an offset plate. (S)

      e.   Process and adhere a stencil to a stretched fabric. (S)

Suggested Instructional Strategies:

1.   Demonstrate the procedure for producing a stripped flat. Show masking sheet layout, position of the gripper margin and location of the film image. Emphasize the appropriate use of masking, red and clear tape in the stripping process.

2.   Demonstrate the process of stretching fabric onto a frame for screen printing.

3.   Lead a class discussion about the importance of standard stripping procedures and the relationship to efficient press start-up and registration.

4.   Show a video about the screen printing process.

5.   Demonstrate the procedure for making an offset plate used in the laboratory. Lead a class discussion about the types of plates and their uses.

6.   Demonstrate the stencil preparation process used in the laboratory. Have students process and adhere a stencil to stretched fabric.

7.   Have students blockout, mask and prepare the screen carrier for the image transfer process.

IV.   Module: **Image Reproduction/Printing**

    A.   Topic: **Printing Systems**

        1.   **Performance Statement:**

           Upon satisfactory completion of this topic, the student will discuss differences in printing systems; describe other reproduction processes; and set up the infeed, imaging unit and outfeed of an image transfer device.

Competencies to be Developed:

After studying this topic, the student will be able to:

a. List four printing processes, discuss their differences in terms of image carrier (plate) structure, and explain the advantages and disadvantages of these processes offer the print manufacturer. (K)

b. List and describe reproduction processes other than lithography, flexography, gravure and screen printing, provide examples for their use, and discuss their advantages for ad agencies, service bureaus and print manufacturers. (K)

c. Load paper or appropriate substrate into the feeder section of a printing device; make all adjustments on the imaging unit to acquire appropriate image position and density; adjust the outfeed section to receive and stack the graphic product; identify appropriate position of all safety devices for normal machine operation. (K) (S)

Suggested Instructional Strategies:

1. Show a video which includes the printing processes being used by today's printing and publishing industry (e.g., "The Pocket Pal Movie").

2. Show examples and lead a discussion about the plates used by the basic processes.

3. Have students bring in examples of graphic products produced by each process. Develop a bulletin board displaying their collective efforts. Lead a discussion related to the display. Identify reasons why a variety of products were produced with different processes.

4. Identify the printing processes available in the laboratory.

5. Display and discuss an overhead, slide or illustration which shows the operation of a laser printer, a copy machine, a wax thermal printer and an ink-jet printer.

6. Produce a display showing examples of output from each reproduction system. Lead a discussion about the uses of these systems and their advantages to the end user.

7. Show a video about the key aspects of the operation of the transfer devices in the technology laboratory. Demonstrate to small groups, the safe set up of the image transfer devices in the laboratory.

8. Develop and implement a learning activity dealing with equipment operation (e.g., dry running an offset press).

B. Topic: **Finishing Operations**
1. **Performance Statement:**
Upon satisfactory completion of this topic, the students will cut paper to press sheet size and make finishing trim cuts; fold paper using available laboratory equipment; perform special finishing operations; perform selected assembly techniques; and perform selected binding processes.

Competencies to be Developed:
After studying this topic, the student will be able to:
   a. Demonstrate safe operation of the cutting device. (K) (S)
   b. Read a ruler and set dimensional stops. (K) (S)
   c. Determine the maximum number of press sheets out of standard stock sheets with minimum waste, and identify an efficient sequence of cuts to produce the desired press sheet size. (K) (S)
   d. List the types of folds capable of being made on the equipment; set up the infeed, folding and outfeed of the machine; identify the paper weight limits of the folding machine; and demonstrate competent operation of the folding machine. (K) (S)
   e. List and describe four special finishing operations, explain when their use is necessary, and discuss how the operations might be done in the technology laboratory. (K)
   f. Discuss manual and automatic assembly processes; define gathering, collating and inserting; and explain how these processes might be performed in the technology laboratory. (K)
   g. Discuss industrial binding processes, identify those processes available in the technology laboratory, and list the correct procedure to perform those available processes. (K)

21

Suggested Instructional Strategies:

1. Demonstrate the safe operation of all cutting devices. Discuss the relationship of accurately cut paper and duplicator press registration (e.g., those machines without accurate infeed, jogger devices).

2. Demonstrate the math used to determine the number of press sheets that can be cut from a stock sheet and demonstrate the proper sequencing of cuts (e.g., cut all widths or lengths first).

3. Show commercial printing jobs that use a variety of folds. Display those that can be done using laboratory equipment.

4. Demonstrate the laboratory equipment, emphasizing folding sheets in halves and thirds. Demonstrate signature folding, emphasizing appropriate page imposition.

5. Have students collect examples of products that include special finishing processes.

6. Display examples of the use of scoring, perforating and die cutting and lead a discussion about how these operations are done. Demonstrate the processes using laboratory equipment.

7. Discuss the differences among gathering, collating and inserting. Arrange to videotape these operations at a local bindery trade shop. Show the video in class followed by a discussion of the techniques observed and how these techniques can be performed in the technology laboratory.

8. While at the local bindery, produce a separate video of binding procedures, such as plastic comb, wire, stapling, stitching, perfect and case. Show examples and lead a class discussion about the practical uses of these procedures.

V. Module: **Industry Related Concerns**
   A. Topic: **Industrial Organization and Careers**
      1. **Performance Statement:**
Upon satisfactory completion of this topic, the student will describe graphic communications industrial organization, graphic communications careers and career planning strategies.

Competencies to be Developed:

After studying this topic, the student will be able to:

    a.   List segments/classifications of industrial services. (K)

    b.   Describe types of printing establishments and enterprises. (K)

    c.   Complete a personnel organization chart. (K) (S)

    d.   Identify the jobs available within the graphics/electronic industry. (K)

    e.   Compare creative, skilled and management level positions. (K)

    f.   Describe the training, background and aptitudes required for selected positions and careers and identify a career that matches goals, abilities and interests. (K) (A)

Suggested Instructional Strategies:

1.   Present a lesson on the organization of the industry, accompanied by textbook reading about segments/classifications of industrial services.

2.   Invite representatives of local printing establishments to class to discuss the services their firms offer.

3.   Obtain a hierarchical chart from local printing establishments and lead a discussion about why a chain of command is important. Have students complete a personnel or an organization chart. Compare creative, skill and management level positions.

4.   Present a lesson that features an overview of the departments of a printing establishment and the careers available in graphic communications.

5.   Have students complete a personal assessment review of their own talents and aptitudes. Assist them in identifying a graphic/electronics communications career that matches goals, abilities and interests.

B.	Topic: **Emerging Technologies and Impacts**
1.	**Performance Statement:**
Upon satisfactory completion of this topic, the student will:

- list and describe emerging technologies in electronic imaging and graphic imaging, including the impact upon current processes, equipment, expense, training and trends in communications;
- explain the social impacts of mass communications.

Competencies to be Developed:
After studying this topic, the student will be able to:
a.	Find indications of new and projected technologies in electronic imaging and graphic imaging in trade periodicals, newspapers and technical literature. (S) (K)
b.	Identify new, emerging and anticipated technical developments in electronic imaging and graphic imaging. (K)

Suggested Instructional Strategies:

1.	Organize a technology learning activity that includes a literature search on technology forecasts. Have students review indexes to identify articles in trade periodicals, newspapers and technical literature.

2.	Lead a group brainstorming session to create a list of new, emerging, and anticipated technical developments. Discuss.

3.	Lead a group brainstorming session to create a list of the effects of mass communications upon society. Include in a subsequent discussion such factors as the quality of life, world literacy, global knowledge of current events, economics, international trade, education, religion, government and law.

4.	Present a discussion outline explaining why ecological impacts of graphic arts materials handling, chemical and waste disposal, reclamation and recycling are significant.

5.	Show an audiovisual presentation that features hazardous chemicals used in graphic arts, recommendations for safe handling and proper methods of disposal.

6.   Present a lesson on methods in which materials can be reclaimed and recycled and the ecological consequences of continued consumption of natural resources.

7.   Lead a group brainstorming session to create a list of ecological impacts of graphic communications. Include in the subsequent discussion the eventual status of materials and waste originating in the school's communications lab.

C.   Topic: **Legal Considerations**

1.   **Performance Statement:**

Upon satisfactory completion of this topic, the student will:

- explain author and designer rights and printer and consumer obligations in honoring copyright and trademark laws;
- explain ethics in graphic and electronic communications.

Competencies to be Developed:

After studying this topic, the student will be able to:

    a.   List printed products, images and software that may not be reproduced without permission. (K)

    b.   Define public domain and software copy protection. (K)

    c.   Discuss the consequences of copyright and trademark infringement. (K)

    d.   Describe the need for model releases in photography. (K)

    e.   Define libel and plagiarism. (K)

    f.   Discuss the consequences of invasion of privacy and unlawful use of people's written work and creative work. (K) (A)

Suggested Instructional Strategies:

1.   Present a lesson that features copyright laws and examples of printed products, images and software that may not be reproduced without permission. Define public domain and software copyright protection.

2.   Lead a class discussion on the consequences of copyright and trademark infringement.

3.   Present a lesson that features individuals' rights to privacy and unlawful use of people's written word and creative work.

BIBLIOGRAPHY

Adams, J.M., Faux, D. and Rieber, L., *Printing Technology*, 3rd ed., Albany, NY: Delmar Publishers, Inc. 1988

Barden, R. and Hacker M., *Communication Technology*, Albany, NY: Delmar Publishers, Inc. 1990

Broekhuizen, R. *Graphic Communications*, Indianapolis: Bobs Merrill, 1985

Dennis, E. and Jenkins, J., *Comprehensive Graphic Arts*, Indianapolis: Howard W. Sams, 1984

Hird, K., *Understanding Graphic Arts*, Ohio: South Western, 1982

Horenstein, H., *Black and White Photography*, Boston: Little Brown and Company

Jones, R.E. and Robb J.L., *Discovering Technology Communications*, San Diego, California,   Harcourt, Brace Jovanovich, 1986

Kagy, F. and Adams, J.M., *Photography for Graphic Arts*, MA: Wadsworth Publishing, 1983

Sanders, M., *Communication Technology*, Mission Hills, California: Glencoe/McGraw Hill, 1991

Spence, W. and Venquist, D., *Graphic Reproduction*, Illinois: Charles A. Bennett, 1980