

I. PRELIMINARY INFORMATION:

- A. CLASS:**.....Graphic Arts
- B. TITLE OF UNIT:**.....Printing Processes
- C. TITLE OF LESSON:**.....Printing Processes introduction and lab
- D. COMPETENCIES ADDRESSED:**...8-1. Identify types of printing processes used in Graphic Arts Industry
6-3. Identify the four basic process colors and kinds of color printing
- E. DATE & TIME:**.....3/3/08 – 3/10/08 AM & PM Classes
- F. WEEK OF INSTRUCTION:**.....3/3/08-3/10/08
- G. INSTRUCTOR:**.....R. Gossett
- H. ADDITIONAL INFORMATION**.....none

II. OBJECTIVES (*obj. ? content ? assessment = Internal Alignment*):*Psychomotor:*

After this lesson, students will be able to find and label examples of printed materials from each type of major printing process. Students will be able to write a research paper consisting of printing processes that are used in a print company of their choosing.

Cognitive:

After this lesson, students will know and recite the 8 printing processes. Students will be able to describe each type of process, its benefits and drawbacks. Student will know which processes are used most often and are most and least expensive.

Affective:

Students will have an appreciation for the different printing processes in relation to their design needs. Students will have an understanding of why different printing processes are chosen.

III. TEACHING METHODS AND TECHNIQUES:

Illustrated Lecture
Question & Answer
Discussion
Other: Lab
Research project

IV. RESOURCES REQUIRED:

Computer/Computer Projector

Handouts

Other: Powerpoint, Research project instructions, attached lab instructions.

V. INTRODUCTION:

“We have spent the last semester learning about how to design for print. We have used our digital printer in this classroom to output our designs. But in the real world of Graphic Art, there are many other ways to output our work. These are Printing Processes. Today we will learn about the 8 different printing processes, their characteristics, and how they work. Then, we will have a lab that will show you how the processes work. After the lab, each of you will create a research paper explaining the printing processes used at a print shop that you choose to research.”

VI. CONTENT (obj. ? content ? assessment = Internal Alignment)*

This lecture content is to be presented with Powerpoint:

WHAT IS A PRINTING PRESS?

Printing press – machine that transfers an image from a plate or other image carrier to a substrate, such as paper.

There are four basic units of any type of printing press:

1. Feeding unit – this is where you put the paper or substrate in.
2. Registration unit – makes sure the the paper is held in the same position for each impression.
3. Printing unit – this is where the ink gets on the paper
4. Delivery unit – area where paper is removed from the press.

There are 8 types of printing processes which are widely used in the industry today:

1. Letterpress/Relief printing
2. Offset Lithography
3. Gravure (intaglio)
4. Engraving

5. Flexographic
6. Thermography
7. Screen printing
8. Digital Printing

Each printing process has certain uses and characteristics. Each process is used for different types of printing.

All printing processes require files to be sent in specific ways. All printing presses, except for digital, require files to be separated according to ink colors or CMYK. This is called color separations. This allows printing plates to be made that will transfer ink onto the substrate separately for each ink color used.

Commercial Printing processes:

1. Letterpress or Relief printing – THINK GUTENBURG - ink is applied to the raised portions of a metal or hard plastic printing plate which is then pressed on the paper or other substrate. It is a type of relief printing. It is similar to using stampers and inkpads or ink rollers. This process began with wooden blocks and then went to moveable type, set by hand and then machine.

Examples – old newspapers, expensive books

2. Offset Lithography – (OIL AND WATER DON'T MIX) Invented in 1798 by Alois Senefelder, lithography uses the fact that oil and water don't mix as the basis of the printing process. A metal or polyester plate is treated so that the image area attracts oil-based inks and the wet non-image areas repel the oil-based inks.

Examples – newspapers (web offset) forms, most large run print jobs.

3. Gravure/Intaglio – (ETCHING) Basically, gravure turns everything in the image into halftone dots.

The plate cylinder consists of tiny cells, varying in depth and width, that hold the ink. As the press runs, a doctor blade scrapes excess ink off the surface of the plate, leaving ink only in cells. As the paper contacts the plate, the ink is transferred, reproducing type, rules, graphics, and photographs as composites of very fine dots. Gravure is used only in very long runs, usually for publications and packaging printing

Examples – wallpaper, wrapping paper, high end catalogs.

4. Engraving - the area of the image to be printed is recessed into the surface of the printing plate and the recessed areas are filled with ink. The incised image may be etched, engraved with chemicals or tools. The image to be printed is incised into the plates, the incisions filled with ink, and excess ink wiped from the plates. Heavy pressure is applied to transfer the ink from the plates to the paper, leaving the surface slightly raised and the back side slightly indented.

Examples – money, fine art prints

5. Flexographic Printing (RUBBER STAMPS)– a type of relief printing that uses flexible printing plates made of rubber or plastic. The inked plates with a slightly raised image are rotated on a cylinder which transfers the image to the substrate. Flexography uses fast-drying inks, is a high-speed print process, can print on many types of absorbent and non-absorbent materials, and can print continuous patterns

Examples - paper and plastic bags, milk cartons, disposable cups, and candy bar wrappers.

6. Thermography(HEATS UP AND RAISES) - produces raised printing similar in appearance to engraving but using a different process. In

thermography, a special powder is added to the ink printed on the paper. The printed piece is heated and the powder and ink mixture dries to form a raised effect on the paper.

Examples – wedding invitations, business cards, letterhead

7. Screen Printing(BURNED IMAGE) – a mesh screen is coated with a thick chemical called emulsion. The image to be printed is printed on film and then laid on the screen. This is exposed to bright light, which burns the image onto the screen. The screen is then rinsed so the emulsion comes off of the areas where there is artwork. Then, plastisol ink is pushed through the screen using a squeegee onto the substrate below. This allows ink to go through only the holes in the screen that have artwork.

Examples – signs, posters, apparel.

8. Digital Printing(COMPUTER TO PAPER) – Similar to a desktop color laser printer, but on a large scale. Toners can be used or inks, but digital presses do not use plates. The artwork is sent directly from computer to press.

Examples – short run full color jobs such as flyers, posters, menus, postcards.

After Powerpoint is viewed, students will participate in a lab which is attached. The lab should take place the next day after the powerpoint lecture.

The third day of the lesson, the research project (directions attached) should be introduced.

The final day of the lesson week will be the quiz on printing processes.

VII. SUMMARY:

There are 8 types of printing processes which are widely used in the industry today:

9. Letterpress/Relief printing
10. Offset Lithography

- 11.Gravure (intaglio)
- 12.Engraving
- 13.Flexographic
- 14.Thermography
- 15.Screen printing
- 16.Digital Printing

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VIII. ASSESSMENT *(obj. ? content ? **assessment** = Internal Alignment):*

Psychomotor:

Students will complete printing process lab in future lesson which will assess ability to recognize the different printing processes, their characteristics, likes and differences.

Cognitive:

Completed Research paper, poster and presentation about a printing process assigned to the student (see attached document - printprocesspaper.pdf)
Completed Printing Process quiz - must get at least 80% to reach competencies.

Affective:

During lecture, Instructor will assess Affective learning through question and answers about printing processes. This will show that students understand why different types of printing processes are used.

IX. ASSIGNMENTS *(reinforce major lesson components):*

Homework: Students will find examples of substrates printed using each of the different printing processes.

Homework: study for printing processes

quiz

X. RELEVANCE TO FUTURE LESSONS:

After students have completed the printing processes lab, research paper and quiz, a field trip is scheduled. The field trip will consist of touring several different print shops.

XI. LESSON/COURSE EVALUATION:

This will be the first time I have taught this lesson. I will add evaluation after it has been taught.

