

Digital Production Printing

Digital production printing is the fastest growing area of the printing industry. This growth and acceptance by customers is being fueled by the ability to produce high quality printing quickly and in a cost efficient manner. There are many examples of work that were previously printed on an offset press being transferred to a digital press.

There are also many new jobs being produced that can only be printed with a digital press.

A key benefit is the ability of the digital printing process to incorporate personalized data into the printed page. This fact is a contributor to the growth of digital printing.

The competencies provided will teach the student the types of digital printing equipment technologies that are commonly used, typical workflows to receive, manage and print a project, the types of printed applications that are appropriate for digital printing and health and safety policies.

The course is segmented into six Subject Areas:

- A. Technology
- B. Financial
- C. Applications
- D. Workflows
- E. Operations
- F. Math and Measurement

A. Technology

Digital printing encompasses multiple technologies. There is a broad spectrum of imaging processes that impact quality, speed and cost of a printed piece. How the different technologies are deployed depends on the type of applications being produced.

The following competencies define the types of digital printing technologies that are in common use within printing establishments.

Imaging technologies

- 1) Describe the imaging process of production toner based (electrophotography)
 - a) Electrostatic Charging
 - b) Laser or LED imaging
 - c) Toner attraction
 - d) Transfer

- e) Fusing
- 2) Describe the imaging process of offset
- 3) Describe imaging process of production inkjet
- 4) Compare the print characteristics of digital, offset and ink jet imaging technologies
 - a) Types of suitable substrates used in each technology
 - b) How solids reproduction compare
 - c) How screen tints compare
 - d) How halftone resolution compares
- 5) List five vendors of digital production printing equipment
- 6) Discuss the types of equipment each vendor provides

Digital versus traditional printing

- 7) Assess the quality differences of toner or inkjet ink versus offset ink
- 8) Estimate the acquisition and running costs of digital, offset and ink jet equipment
- 9) List manpower skill requirements of operating a digital versus offset press
- 10) Contrast the environmental impact of operating digital versus offset equipment

RIP (Raster Image Processor)

- 11) Discuss the purpose of a RIP (Raster Image Processor)
- 12) Illustrate a flowchart of steps on how a RIP prepares a file for printing
- 13) Identify features and functions of a RIP

Paper Handling

- 14) Describe sheet fed paper transport of a digital press
- 15) Contrast friction feed versus vacuum feed
- 16) Describe roll fed paper transport of a digital press
- 17) Compare sheet fed versus roll fed paper transport systems
- 18) Describe duplexing of a sheet

Finishing

- 19) Identify common finishing capabilities built into digital printer
- 20) Identify common in-line finishing options available
- 21) Utilize built in finishing capabilities
- 22) Utilize in-line finishing capabilities
- 23) Program and print ten page job to staple in upper left corner
- 24) Program and print eight page job to in-line saddle stitch finisher

Color

- 25) Define monochrome digital printing
- 26) Define highlight digital printing
- 27) Define full color digital printing
- 28) Cite examples of print applications produced by monochrome, highlight and full color presses
- 29) Discuss the use of Pantone colors in digital printing
- 30) Explain how the simulation of Pantone colors are produced by CMYK on a digital press
- 31) Discuss special colors and coatings used in digital printing

Substrates

- 32) Describe the characteristics of paper that are used for digital printing versus offset
- 33) List common weights of papers that are used in digital printing
- 34) List common sizes of paper that are used in digital printing
- 35) Explain the importance of paper grain direction
- 36) Distinguish short and long grain papers
- 37) Describe maximum “imaging area” versus maximum substrate size
- 38) Describe the importance of paper conditioning prior to running the digital press.
- 39) Recognize the types of paper that are unsuitable for digital printing
- 40) Identify types of specialty paper that are used with digital printing
- 41) Assemble a sample pack of five papers printed from same file on a digital press
- 42) Evaluate print quality of the five papers printed on digital press

Printing Speed

- 43) Review range of printing speeds of digital printers
- 44) Discuss Logical Pages Per Minute
- 45) Contrast printing speeds of digital and offset presses

B. Printed Products

Digital printing allows the production of products that have unique characteristics. These products have created applications that satisfy many customer requirements. Applications are defined as the categories of printed products.

There are many types of printed products that can only be produced with digital printing. This feature is one of the reasons for the growth of digital print.

The following competencies discuss the types of printed projects that are being produced with digital printing technologies.

Advantages of digital printing

- 46) List the advantages of digital printing versus offset
- 47) Assess the cost and production time advantage of no platemaking with digital print
- 48) Compare the speed of completing a short run project with digital or offset printing
- 49) Compare the speed of completing a medium run project with digital or offset printing
- 50) Compare the speed of completing a long run project with digital or offset printing
- 51) Compare typical amounts of waste generated by digital versus offset printing
- 52) Assess in-line finishing advantages of digital printing
- 53) Develop possible customer objections and responses to using digital printing

Common digital printing applications

- 54) Identify common types of printed products produced with digital printing
- 55) Collect five typical applications that are appropriate for digital printing

Print on demand

- 56) Define Print on Demand
- 57) Evaluate the benefits of producing exact quantities when needed versus having to inventory printed materials

Variable Data Printing

- 58) Define variable data printing
- 59) Evaluate the benefits of using variable data printing
- 60) Recognize the levels of complexity of variable data printing from name and address to cross media communications
- 61) Collect examples of different levels of complexity
- 62) Explain reasons that a customer would use variable data printing
- 63) List major suppliers of Variable Data software
- 64) Create and print a variable data printed piece using name and address information

Cross media communications

- 65) Define cross media communications
- 66) Discuss the role of digital printing in a cross media campaign
- 67) Explain the components of a cross media campaign
- 68) Collect examples of cross media communications that use digital print
- 69) Evaluate the benefits to a business of a cross media campaign that includes digital print

C. Workflows

Digital production printing has changed how printed products are being produced. Steps in the work process that have been impacted are how a file is created by a customer, how the file is transported to a printing company and how the project is managed by the printing company.

Changes have also occurred in many printing organizations and as a result, new work processes and skillsets are required.

The following competencies discuss the creation and output of files to a digital press.

File creation

- 70) Define the Adobe Portable Document Format (PDF)
- 71) Review the PDF settings of creating a file for digital print
- 72) Discuss how bleeds are created when creating a project for digital printing
- 73) Determine how a bound document is created for digital printing
- 74) Review bitmap resolution requirements when creating a project for digital printing
- 75) Produce a PDF file using digital printing settings

Color Management

- 76) Review color management capabilities of a digital printer
- 77) Contrast color management capabilities of digital printing versus offset
- 78) Explain the use of a spectrophotometer
- 79) Evaluate color output of digital and offset printing

File transfer

- 80) Identify common methods of transporting a file from customer to print shop
- 81) Describe FTP (File Transport Protocol)
- 82) Describe a Web to Print system
- 83) List common features and functions of a Web to Print system
- 84) Select examples of Web to Print systems found on the Web
- 85) Contrast features and functions of selected examples of Web to Print systems found on the Web

Preflight

- 86) Define preflighting of a file
- 87) Record common file issues discovered during preflight

Imposition

- 88) Define imposition
- 89) Compare imposition that is performed in prepress versus a digital printer

Proofing

- 90) Explain how proofs are used in a digital printing workflow
- 91) Identify the steps to produce traditional proof versus one made on a digital printer
- 92) Evaluate the quality of a traditional proof versus one made on a digital printer

Print Queue

- 93) Define print queue
- 94) Determine how a print queue is created
- 95) Explain how print queues can be optimized by a digital press operator
- 96) Release a job from RIP to Print Queue
- 97) Release a job from Print Queue to printer

Quality Control

- 98) Review print shop quality control Standard Operating Procedures (SOP)
- 99) Discuss quality systems used in digital printing operation (ISO, Six Sigma, TQM)
- 100) Recognize common quality defects of digital printing
- 101) Evaluate samples of digital printing for quality defects

Storage of file for reprint

- 102) Determine the benefits of proper storage of files for reprints
- 103) List print shop file storage Standard Operating Procedures (SOP)
- 104) Select, retrieve and reprint a stored file

D. Operations

New operating models and procedures have developed as a result of the growth of digital printing. From sourcing of personnel to environmental factors of the digital pressroom, there are many factors to consider when managing a digital operation.

The following competencies define the workflow steps of printing a project with a digital press.

Print job instructions

- 105) Describe a job ticket

- 106) Determine job specifications from a job ticket
- 107) Program digital printer based on job specifications from a job ticket
- 108) Discuss Job Definition Format (JDF)

Maintenance Calibration

- 109) Review maintenance procedures for a digital press
- 110) Compare maintenance procedures of digital printing versus offset
- 111) Describe calibration procedures for a digital press
- 112) Compare calibration procedures of digital printing versus offset

Roles and responsibilities

- 113) List common work responsibilities of digital press operator

Skills and training required

- 114) Identify skill requirements of a digital press operator
- 115) Determine sources of training received by digital press operator
- 116) Review training provided by vendor

Production metrics

- 117) Define a production metric used in the printing industry
- 118) Discuss capacity and production planning
- 119) Review common production metrics that are used to gauge performance of digital printing operation
- 120) Compare production metrics of digital printing and offset printing

Pressroom environment

- 121) Determine ideal temperature and humidity of digital pressroom
- 122) Cite common printing issues that occur when temperature and humidity are not ideal
- 123) Design a physical layout of digital pressroom

E. Financial

There is a growing demand for cost effective print. Digital printing creates opportunities for printers to offer printing for their customers that better meets their customers cost and delivery requirements. As

digital printing technology has emerged, new financial models have developed. This has impacted the cost of acquiring equipment and also has impacted the cost of producing a printed page.

The following competencies introduce the financial considerations of acquiring and operating a digital press.

Costs of print

- 124) Explain why digital printing is less expensive when low quantities are required
- 125) Identify the costs of a digital print operation
- 126) Analyze typical costs for digital printing and offset at several volume levels

Cost of equipment

- 127) Review the costs of several digital presses
- 128) Review the costs of digital printing accessories

Leasing arrangements

- 129) Define leasing
- 130) Compare leasing versus a purchase of a digital press
- 131) Review a leasing contract
- 132) Discuss Cost per Copy

Maintenance service and ink

- 133) Determine typical maintenance contract terms
- 134) List items covered under maintenance terms
- 135) Review a maintenance contract

Estimating pricing

- 136) Define estimating a printed project
- 137) Review estimating procedures of digital printing
- 138) Compare estimating procedures of digital printing versus offset printing
- 139) Develop a typical estimate for several different types of projects
- 140) Identify computer aided estimating systems

F. Math and Measurement

The use of math and measurement skills is critical in a wide range of job functions within the graphic communications industry. Because of the many units of measurement only used in the graphic communications industry, it is important to be able to work with them.

The math and measurement application competencies were designed to reinforce math skills necessary for successful employment within the graphic communications industry.

- 141) Solve addition of whole number problems—two and three digits.
 - *Calculate total number of hours worked in two eight hour days*
 - *Calculate total number of jobs if 103 were produced in January and 169 were produced in February.*
- 142) Solve multiplication of whole numbers—two and three digits.
 - *Calculate total weight of 18 cartons of paper if each weighs 40 pounds*
 - *Calculate total number of sheets in 15 reams if each ream contains 500 sheets*