Instructional Framework

Digital Printing

CURRICULUM CONNECTION

10.0200.20

This Instructional Framework identifies, explains, and expands the content of the standards/measurement criteria, and, as well, guides the development of multiple-choice items for the Technical Skills Assessment. This document corresponds with the Technical Standards endorsed on May 3, 2019.

Domain 1: Production Process Instructional Time: 40 - 50%	
STANDARD 4.0 ANALYZE THE TYPES OF DIGITAL PRINTING TECHNOLOGIES THAT ARE IN COMMON USE WITHIN PRINTING ESTABLISHMENTS	

4.1 Describe the imaging process of production toner-based digital output devices (i.e., electrostatic charging, laser, or LED imaging, toner attraction, etc.)	● Imaging process
	   ○ Electrostatic charging
	   ○ Laser
	   ○ LED imaging
	   ○ Toner attraction

4.2 Compare the print characteristics of digital, offset, and inkjet imaging technologies (i.e., suitable substrates, solids, screen tints, halftone resolution, etc.)	● Print Characteristics
	   ○ Ink types
	      ■ Solvent
	      ■ Eco-solvent
	      ■ Pigment
	      ■ UV
	      ■ Dye
	      ■ Sublimation
	   ○ Suitable substrates
	   ○ Solids
	   ○ Screen tints
	   ○ Halftone resolution

4.3 Identify the skill requirements of a digital press operator	● Skill requirements
	   ○ Quality control analysis
	   ○ Operation monitoring
	   ○ Critical thinking
	   ○ Equipment maintenance
	   ○ Troubleshooting
	   ○ Complex problem solving

	o Ability to select appropriate equipment, etc.
STANDARD 7.0 DETERMINE THE PHYSICAL CHARACTERISTICS OF VARIOUS SUBSTRATES AND THE IMPORTANCE OF PROPER HANDLING DURING THE PRINT RUN	

7.1 Identify the characteristics of paper (e.g., weight, finish, thickness, brightness, opacity, and grain direction)	● Paper characteristics
	  o Weight
	  o Finish
	  o Thickness
	  o Brightness
	  o Opacity
	  o Grain direction

7.2 Identify weight, coating, and size from a label found on a ream, box, or skid of paper	● Interpret a label from a ream, box, or skid of paper

7.3 Identify specialty substrates (i.e., carbonless, pressure sensitive, synthetic, metallic, etc.)	● Specialty substrates by uses
	  o Carbonless
	  o Pressure sensitive
	  o Synthetic
	  o Metallic

7.4 Explain the importance of paper conditioning	● Moisture ● Temperature ● Relative humidity

7.5 Select the appropriate paper for different applications (i.e., magazine, business card, poster, direct mail, letterhead, etc.)	● Paper selection
	  o Magazine
	  o Business card
	  o Poster
	  o Direct mail
	  o Letterhead

7.6 Define a parent sheet vs. a press sheet	● Parent sheet and its characteristics ● Press sheet and its characteristics

7.7 Define folding techniques (i.e., gate-fold, z-fold, accordion, tri-fold, parallel, etc.)	● Folding techniques
	  o Gate-fold
	  o Z-fold
	  o Accordion
	  o Tri-fold
	  o Parallel fold

STANDARD 8.0 PREPARE DOCUMENT AND ASSETS FOR OUTPUT AND PRODUCTION	

8.1 Describe a job ticket	● Job ticket components
	  ○ Order details
	  ○ Customer data
	  ○ The production file to be printed
	  ○ Specifications for each print option/service
	  ○ Operator notes with production guidance, etc.

8.2 Examine the steps of preflighting a print file	● Preflighting steps

8.3 Identify common quality issues that are found during the preflight process	● Common quality issues
	  ○ Wrong color models (example RGB is provided instead of CMYK)
	  ○ Low-Res imagery
	  ○ Transparent images
	  ○ Non-embedded fonts and/or corrupted fonts
	  ○ Bleed issues

8.4 Perform corrections to problems found during the preflight process (i.e., page size incorrect, font substitution, bleeds missing, etc.)	● Correcting issues
	  ○ Page size incorrect
	  ○ Font substitution
	  ○ Bleeds missing

8.5 Describe page orientation and imposition	● Page orientation
	  ○ Portrait
	  ○ Landscape
	● Imposition preparations for the production process

8.6 Create a folding dummy	● Folding dummies ● Discover and solve problems prior to printing and folding

8.7 Discuss the purpose, features, and functions of a Raster Image Processor (RIP)	● Raster Image Processor (RIP)
	  ○ Purpose
	  ○ Features
	  ○ Functions
	● Use a RIP to setup a print job using its features and functions

8.8 Determine proper resolution for a specific output device (i.e., web, screen, print, etc.)	● Proper resolution
	  ○ Web - 72 dpi
	  ○ Computer screen - 96 dpi
	  ○ Silk screen - 300 dpi

	o Print - 300 dpi, but 150 dpi is lowest you should print

8.9 Identify printer's marks (e.g., + registration, trim, bleed, and fold)	● Printers marks
	  o Registrations
	  o Trim
	  o Fold
	  o Bleed
	  o Color bars
	  o Center marks
	  o Slug
	  o Crop marks

STANDARD 9.0 DETERMINE BASIC PROOFING TYPES AND MATERIALS AND THEIR IMPORTANCE	

9.1 Define electronic proof (e.g., PDF, on-screen soft proof, and electronic rendering)	● Electronic proof
	  o PDF
	  o Soft proof simulation
	  o Cost effectiveness

9.2 Define low-resolution hard copy paginated proof	● Mock-up for print
9.3 Define high-resolution contract color proof	● Color match ● Dot based proof
9.4 Define a hard copy proof on actual substrate	● Customer evaluation ● Accuracy
9.5 Define sampling of Variable Data Proofing	● Variable Data Proofing (VDP) ● One on one approach ● Customization
9.6 Evaluate the proof internally to the job ticket and specifications	● Modifications if needed ● Quality Control
9.7 Explain the proof to the customer for approval	● Importance of contracts ● Simple pages
STANDARD 11.0 DETERMINE PRINT PRODUCTION WORKFLOW	

11.1 Identify and prepare substrate for specific processes (i.e., paper, fabric, materials, etc.)	● Substrates
	  o Various types, thickness and coatings of papers
	  o Fabric
	  o Materials

	o Plastics
	o Metal
	o Glass
	o Scrim banner, etc.

11.2 "Set up" the output device for production (i.e., ink, toners, tray size, etc.)	● Output device setup
	  o Installation of Toners
	  o Ink
	  o Paper trays
	  o Fusers
	  o Drums
	  o Screens
	  o Plates
	  o Other consumables

11.3 Explain the necessity of make ready and overs	● Print ready o Overs and unders

11.4 Compare the press sheet to the customer-approved proof to ensure accuracy (i.e., color, quality, pagination, back up, size, paper stock, etc.)	● Print internally
	● Customer approved proof
	  o Color
	  o Quality
	  o Pagination
	  o Back up
	  o Size
	  o Paper stock, etc.

11.5 Troubleshoot and adjust production variances (i.e., imposition, registration, color, size, etc.)	● Troubleshoot and adjust for production variances
	  o Imposition
	  o Registration
	  o Color
	  o Size

STANDARD 12.0 ANALYZE THE COMMON TYPES OF FINISHING AND FULFILLMENT	

12.1 Identity differences within inline finishing (i.e., collating, stitching, folding, drilling, etc.)	● Inline finishing
	● Prior to coming off the press
	  o Collating
	  o Stitching
	  o Folding
	  o Drilling, etc.

12.2 Identify differences within offline finishing (i.e., binding, padding, drilling, folding, etc.)	● Offline finishing
	● Post press
	   ○ Binding
	   ○ Padding
	   ○ Drilling
	   ○ Folding, etc.

12.3 Identify specialty finishing techniques (i.e., foil stamping, embossing, die-cutting, scoring, coating, laminating, hand-finishing, etc.	● Specialty printing techniques
	   ○ Foil stamping
	   ○ Embossing
	   ○ Die-cutting
	   ○ Scoring
	   ○ Coating
	   ○ Laminating
	   ○ Hand-finishing, etc.

12.4 Identify critical steps for finishing preparation (i.e., jog paper, verify print count, job specifications, etc.)	● Critical steps for finishing preparation
	   ○ Jog paper
	   ○ Verify print count
	   ○ Job specification, etc.

12.5 Package product securely for delivery (i.e., shrink wrap, slip sheet, custom box, packaging slip, mail trays, etc.)	● Product packaging
	   ○ Shrink wrap
	   ○ Slip sheet
	   ○ Custom box
	   ○ Packaging slip
	   ○ Mail trays, etc.

12.6 Accurately label package(s) for final destination including information specific to contents of package (i.e., company, product, product ID#, quantity, barcode, date, etc.)	● Package labeling
	   ○ Company
	   ○ Address
	   ○ Contact person
	   ○ Product
	   ○ Product ID#
	   ○ Quantity
	   ○ Barcode
	   ○ Date, etc.

STANDARD 13.0 UTILIZE MEASUREMENT UNITS AND TOOLS	
13.1 Explain print specific units of measurement (i.e., pica, point, pixel, inches, etc.)	- Print specific units of measurement - Picas in an inch - Points in an inch - Pixel inches - Explain how 3p24 reads
13.2 Read a ruler	- Read a ruler - Identification of ruler marks
13.3 Convert decimals to fractions and fractions to decimals	- Math conversions - Fractions - Decimals
13.4 Convert print specific units of measure from one to another	Formulas for converting units of measurements
13.5 Explain print specific measurement tools (i.e., micrometer, densitometer, spectrophotometer, loupe, type gauge, etc.)	- Print measurement tools - Micrometer - Densitometer - Spectrophotometer - Loupe - Type gauge
13.6 Solve basic ratio and proportion problems	- Ratio and proportion problems - Use of ratios and proportions in printing projects
13.7 Calculate imposition for best yield	- Maximize the yield of a sheet - Imposition that also maximizes the best use of folds
STANDARD 14.0 ESTIMATE A JOB	
14.1 Calculate material costs (i.e., ink, paper, packaging, finishing, etc.)	- Print job material cost - Ink and toner - Paper/substrate - Packaging - Finishing
14.2 Calculate equipment costs	- Calculate equipment cost - Purchase or lease - Equipment repair - Long term consumables

14.3 Calculate labor costs	• Labor costs
14.4 Calculate equipment run times	• Equipment run time calculations • Electricity and cost of physical site
14.5 Calculate shipping costs	• Shipping costs
14.6 Calculate overhead	• Overhead costs
14.7 Verify total cost of a job	• Verify total cost of job
14.8 Determine market value (e.g., final cost to client)	• Determine market value o Final cost to client
14.9 Determine the most cost-effective process for job	• Most cost-effective process for job
14.10 Review actual job cost to original estimate	• Actual job cost to original estimate

Domain 2: Digital Skills
Instructional Time: 25 - 35%

STANDARD 5.0 UTILIZE INDUSTRY STANDARD SOFTWARE

5.1 Create multi-page documents using facing pages, single pages, page size and orientation, and bleeds	• Multi-page documents
	  o Spreads
	  o Facing pages
	  o Signature pages
	  o Master pages
	  o Single pages
	  o Bleeds
	  o Orientation

5.2 Describe the differences between vector and raster graphic	• Vector vs. raster graphics
	  o Bitmaps
	  o Scalability
	  o File size

5.3 Create vector graphics	• Vector graphic creation
	  o Industry standard software i.e., Adobe Illustrator, etc.
	  o Editing paths utilizing anchor points, segments, and Bezier curves

	o Vector file types: AI, EPS, SVG, CDR o Uses in industry

5.4 Create raster images	● Raster image creation
	  o Industry standard software (i.e., Photoshop, InDesign, etc.)
	  o Raster file types: JPEG, PNG, PDF, TIF/TIFF, BMP, GIF
	  o Editing/creation
	  o Non-destructive vs. destructive
	  o Best file type for the purpose/job

5.5 Evaluate the characteristics of using the Adobe Portable Document Format (PDF)	● Characteristics of Adobe Portable Document Format (PDF)
	  o Multi-platform
	  o Security
	  o Accessibility
	  o Searchable
	  o Compression
	  o Font management
	  o Extensibility

5.6 Determine the appropriate settings and options for a print ready PDF for digital output	● Print ready PDF for digital output
	  o High resolution for printing to digital device
	  o Steps for creating print ready pdf using export in InDesign
	  o Steps for creating print ready pdf using Photoshop

5.7 Merge a variable data file with an application file for unique piece production	● Variable data files
	  o Creation
	  o Merging
	  o Fields and records in variable data files
	  o File types: CSV, TXT
	  o Direct marketing
	  o Unique piece production

5.8 Define a crossover	● Crossover ● Techniques for creating an image crossing over

5.9 Describe a common digital workflow (e.g., file transfer, storage, backup, archival, and naming conventions)	● Common digital workflow
	  o File transfer
	  o Storage
	  o Backup
	  o Archival
	  o Naming conventions

5.10 Explain compliance with United States Postal Service (USPS) and United Parcel Service (USP) regulations	● Compliance with direct mailers
	● Postal regulations
	   ○ United States Postal Service (USPS)
	   ○ United Parcel Service (USP)

STANDARD 6.0 ANALYZE THE IMPACT OF COLOR	
6.1 Discuss RGB (Red, Green, Blue) additive color model	● RGB (Red, Green, Blue) light theory ● Additive colors ● 0-255 ● Computer monitor
6.2 Discuss CMYK (Cyan, Magenta, Yellow, Black) subtractive color model	● CMYK (Cyan, Magenta, Yellow, Black) subtractive colors ● 4 color printing process
6.3 Discuss spot color model (Pantone)	● Spot color model ● Pantone Matching System (PMS) ● Pre-mixed ink
6.4 Compare color gamut capabilities of devices used in print workflow	● Device color gamut capabilities ● Large enough to contain all image data from devise ● Working spaces have no direct relation to any specific device

6.5 Describe the purpose and function of International Color Consortium (ICC) profiles	● International Color Consortium (ICC) profiles
	● Purpose and function
	   ○ Standards in color management
	   ○ Uniformity

6.6 Describe calibration vs. characterization of devices (e.g., monitor, camera, scanner, printer, proofer, and press)	● Device calibration vs. characterization
	   ○ Monitor
	   ○ Camera
	   ○ Scanner
	   ○ Printer
	   ○ Proofer
	   ○ Modifying colors
	   ○ Color Management Module (CMM)

STANDARD 10.0 DEMONSTRATE SAFE USE OF EQUIPMENT AND CONSUMABLES	
10.1 Locate and interpret Safety Data Sheets (SDSs) and safety measures	● Safety Data Sheet (SDS) ● Material Safety Data Sheet (MSDS) ● Similarities, differences, and uses each

10.2 Apply OSHA rules and regulations and their applications (i.e., protective equipment, material handling, etc.)	● Occupational Safety and Health Administration (OSHA) safety rules and regulations ○ Protective equipment ○ Safety locks ○ Material handling
10.3 Define and apply lab safety and emergency procedures (i.e., fire, chemical, etc.)	● Lab safety and emergency procedures ○ Chemicals, toners, and inks storage ○ Chemicals, toners, and inks disposal ○ Fire procedures ○ Fire suppression equipment
10.4 Evaluate device-specific safety	● Device-specific safety ○ Pinch points ○ Wrap points ○ Shear points ○ Crush points ○ Pull-in points ○ Thrown objects ○ Businesses and operators' responsibilities for a safe environment with equipment. ○ Appropriate labeling of hazards on equipment ○ Tag out and locking devices on equipment
10.5 Perform necessary maintenance for all equipment	● Preventive maintenance schedule ● The use of down time on the schedule ● Steps of preventative maintenance
10.6 Recycle waste	● Procedures for minimizing waste ○ Disposal of waste ○ Substrates ○ Toners ○ Inks ○ Other printing components ○ Use of MSDS in waste disposal
10.7 Properly dispose hazardous materials	● Hazardous materials disposal ● Consequences improper disposal ● EPA (Environmental Protection Agency) ● Appropriate techniques for disposing of hazardous waste

Domain 3: Communication Skills
Instructional Time: 10 - 15%

STANDARD 3.0 ANALYZE FACTORS THAT CONTRIBUTE TO PERSONAL SUCCESS IN THE COMMUNICATION MEDIA TECHNOLOGIES INDUSTRY

3.1 Employ written, verbal, and non-verbal communications that are appropriate to the target audience and situation	- Various media communication - Email - Memo/letter - Social media/Internet - Presentation - Digital presentation
3.2 Apply formatting, editing, and proofreading skills to all forms of writing	- Proofreading - Peer review - Conventions for various written communications
3.3 Prepare and deliver a presentation using terminology standard to the Communication Media Technologies industry	- Industry terminology for graphic design - Speak clearly - Body posture appropriate for presenting - Eye contact - Limit distractions - Practice social norms appropriate for audience - Rehearse presentation
3.4 Use interpersonal skills when communicating with colleagues, clients, and vendors (i.e., active listening, empathy, body language, openness, negotiation, problem-solving, conflict resolution, assertiveness, positive attitude, etc.)	- Communication with colleagues, clients, and vendors - Active listening - Empathy - Body language - Openness - Negotiation - Problem-solving - Conflict resolution - Assertiveness - Positive attitude, etc.
3.5 Identify professional "dress for success" standards and practices for the Communication Media Technologies industry	- Impact of professional dress - Formal - Business casual

3.6 Explain basic types of résumés and their use (e.g., chronological, functional, combination, targeted, and creative)	● Resume types
	  o Chronological
	  o Functional
	  o Combination
	  o Targeted
	  o Creative

3.7 Identify the basic parts of a résumé (e.g., contact/address section, objective, profile, career summary, experience section, education section, and reference section)	● Resume parts
	  o Contact/address section
	  o Objective
	  o Profile
	  o Career summary
	  o Experience section
	  o Education section
	  o Reference section

3.8 Explain considerations for résumé format (i.e., simple font; plenty of white space; personalize and customize to reflect your skills and abilities, etc.)	● Resume format
	  o Simple font
	  o Plenty of white space
	  o Personalize and customize to reflect your skills and abilities, etc.

3.9 Define a professional portfolio (e.g., organized collection of relevant writing, graphics, and projects; artifacts showcasing talents and relevant skills; and summary of professional growth)	● Professional portfolio
	  o Organized collection of relevant writing, graphics, and projects
	  o Artifacts showcasing talents and relevant skills
	  o Summary of professional growth

3.10 Describe portfolio types serving different purposes (i.e., working portfolios, display portfolios, assessment portfolios, etc.)	● Professional portfolio types and purposes
	  o Working portfolios
	  o Display portfolios
	  o Assessment portfolios, etc.

3.11 Describe ways to build a professional portfolio [i.e., binder, digital (iPad), online portfolio, etc.]	● Professional portfolio formats
	  o Binder
	  o Digital (iPad)
	  o Online portfolio, etc.

Domain 4: Practice and Ethics
Instructional Time: 5 - 10%

STANDARD 1.0 ANALYZE THE COMMUNICATION MEDIA TECHNOLOGIES INDUSTRY, ITS BUSINESS PRACTICES, AND ITS ROLE IN THE ECONOMY

1.1 Investigate the history and evolution of the Communication Media Technologies industry (i.e., technology, processes, production, etc.)	• History and evolution of the Communication Media Technologies industry
	   ○ Technology
	   ○ Processes
	   ○ Production, etc.

1.2 Examine the impact of social media and emerging technologies on the Communication Media Technologies industry	• Consequences of use • Appropriate use • Proper etiquette
1.3 Research the societal and economic impact of the Communication Media Technologies industry	• Ethical responsibilities • Inform • Educate or entertain • Influence • Trends
1.4 Examine the impact of the Communication Media Technologies Industry on marketing practices	• Promotion, production, and distribution • Advertising • Collaboration • Marketing practices • Techniques
1.5 Explain how diversity and inclusion are managed in the workplace to create a supportive culture	• Cultural • Ethical • Multi-generational • Policies and procedures • Cultural awareness training
1.6 Define cultural diversity and the need for awareness and sensitivity in the workplace	• Demographics • Respect for everyone • Education/professional development
1.7 Explain the acceptance of multiculturalism in the workplace (i.e., treating impartially and fairly each ethnic group, etc.)	• Multiculturalism in the workplace ○ Treating impartially and fairly each ethnic group, etc.

1.8 Analyze customer service practices appropriate to the Communication Media Technologies industry	- Clear and professional communication - Active listening - Paying attention to all details - Knowledgeable - Follow through - Go above and beyond - Role playing, scenarios, modeling
1.9 Examine time management practices appropriate to the Communication Media Technologies industry	- Using time wisely - Project timelines - Deadline management - Organizational skills - Multitasking - Prioritizing - Problem-solving - Flexibility
1.10 Identify professions that comprise the Communication Media Technologies industry (i.e., animation, broadcasting, filmmaking, graphic design, illustration, music and audio productions, photography, printing, publishing, etc.)	- Communication Media Technologies industry professions - Animation - Broadcasting - Filmmaking - Graphic design - Illustration - Music and audio productions - Photography - Printing - Publishing, etc.
1.11 Comply with the safety standards and regulations specific to OSHA	- OSHA Safety Standards/training and certification - ClickSafe - Safety First
STANDARD 2.0 ANALYZE ETHICAL AND LEGAL ISSUES RELATED TO THE COMMUNICATION MEDIA TECHNOLOGIES INDUSTRY	
2.1 Distinguish among copyright, intellectual property, and proprietary rights	- Copyright vs. intellectual property vs. proprietary rights - Similarities and differences
2.2 Investigate copyright, intellectual property, proprietary rights, plagiarism, and software licensure	- Copyright (duration, beginning, and expiration) - Intellectual property - Proprietary rights - Plagiarism

	● Software license
	○ Site license
	○ Individual license
	○ Educational license

2.3 Discuss consequences in violating copyright, privacy, and data security laws (i.e., monetary penalties, prison, injunctions, financial restitution, etc.)	● Copyright, privacy, and data security laws violations
	  ○ Monetary penalties
	  ○ Prison
	  ○ Injunctions
	  ○ Financial restitution, etc.

2.4 Explain fair use (i.e., authorships, credit lines, parody, news reporting, criticism and commentary, etc.)	● Fair use
	  ○ Authorships
	  ○ Credit lines
	  ○ Parody
	  ○ News reporting
	  ○ Criticism and commentary, etc.

2.5 Differentiate between legal and ethical standards as they apply to decision-making in the Communication Media Technologies industry	● Legal vs. ethical standards ● Business code of ethics ● Compare and contrast
2.6 Explain libel, privacy, censorship, and first amendment rights	● Clarifying differences ● Classifying examples