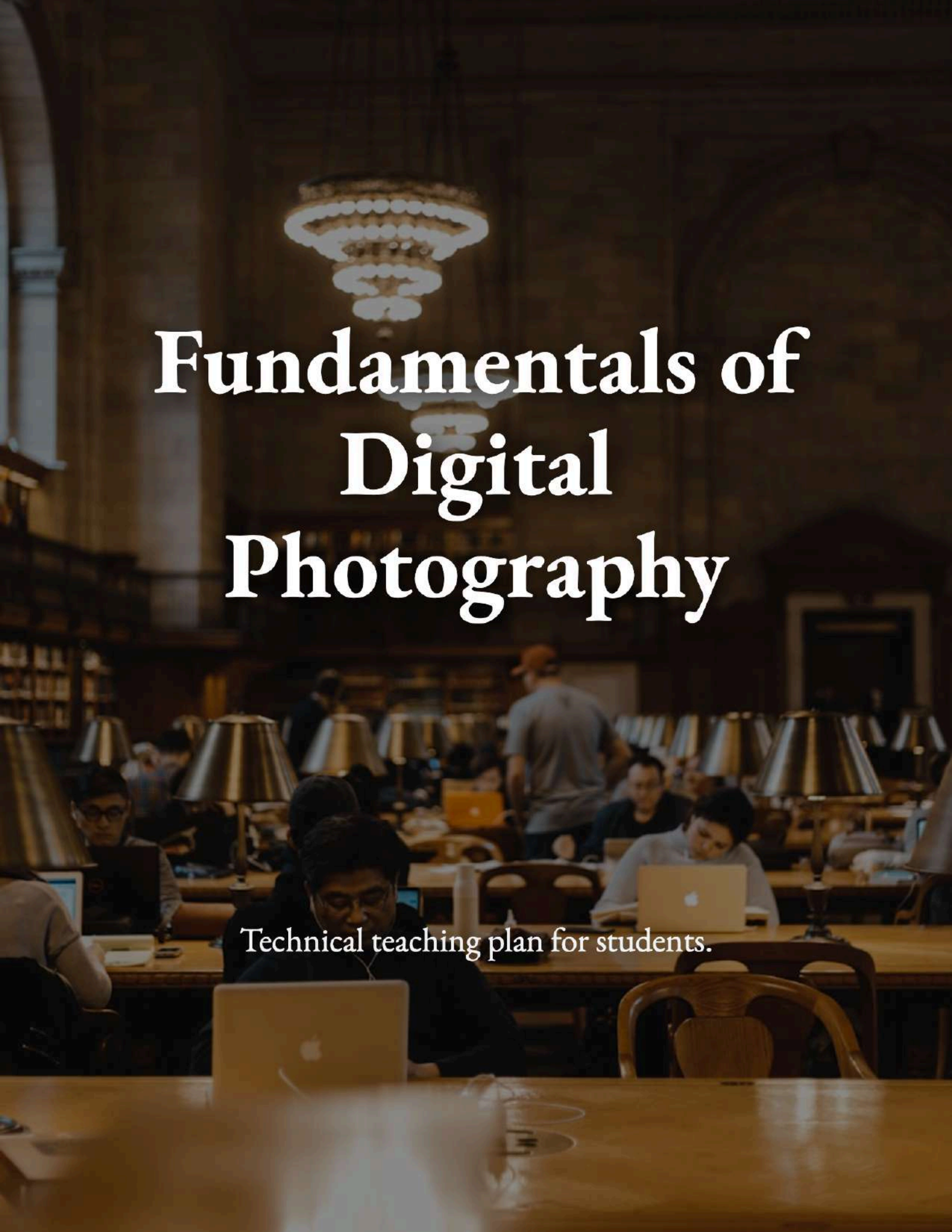

Fundamentals of Digital Photography

Technical teaching plan for students.

Introduction

Welcome to **Fundamentals of Digital Photography**. Whether you're just starting out or looking to refine your skills, each chapter delivers actionable knowledge you can apply immediately.

Table of Contents

CHAPTER 1

Fundamentals of Digital Photography

LESSON OBJECTIVES:

By the end of this lesson, students will:

- Identify and define the key components of digital photography, including camera types, image sensors, and storage media.
- Understand the basic functions and settings of digital cameras such as ISO, shutter speed, and aperture.
- Demonstrate how to prepare equipment and memory storage for a photography session.
- Align foundational skills with photography standards related to image quality and file management.
- Materials needed: Digital camera (DSLR or mirrorless), memory card (SD or CF), camera manual, tripod (optional).
- Lesson duration: 60 minutes.

I DO (DIRECT INSTRUCTION):

Begin by explaining that digital photography captures images electronically via sensors instead of film. For example: “A digital camera uses a sensor to record light and convert it into a digital file.” Show a camera and point out parts such as the lens, sensor location, and controls.

Demonstrate essential camera settings:

- ISO controls sensor sensitivity to light. Lower ISO (e.g., 100) produces clearer images in bright conditions; higher ISO (e.g., 1600) is used in low light but adds noise.
- Shutter speed controls exposure time. Faster speeds (1/500 sec) freeze motion; slower speeds (1/30 sec) create motion blur.
- Aperture (f-stop) controls the lens opening size, affecting depth of field: lower f-numbers (f/2.8) give shallow focus, higher (f/16) give greater depth.

Show how to insert a memory card into the camera. Explain file formats: JPEG is compressed and smaller, RAW files retain more detailed data for editing but are larger.

WE DO (GUIDED PRACTICE):

Guide students to check their camera settings: “Set ISO to 400, shutter speed to 1/125, and aperture to f/5.6.” Confirm settings visually or via the camera LCD screen. Prompt: “What happens if you increase ISO to 800?” (Answer: image becomes brighter, noise increases). “Try changing shutter speed to 1/30 sec and describe what effect this would have on moving subjects.” (Answer: motion blur increases).

Assist students in inserting and removing memory cards safely. Verify that they understand the difference between JPEG and RAW by showing examples on your camera or computer.

YOU DO (INDEPENDENT PRACTICE):

Instructions: Prepare your camera for a basic photo shoot outdoors. Set ISO between 100-400 depending on light, adjust shutter speed to freeze motion (1/125 or faster), and choose aperture to control focus. Insert a formatted memory card. Take five photos applying these settings.

Success criteria: Clear images without blur (unless intentional), memory card properly inserted and recognized by camera, settings adjusted appropriately to lighting.

Differentiation:

- Scaffolded learners use automatic mode and review settings with teacher support.
- Advanced learners manually adjust all settings and experiment with low light or motion effects.

ASSESSMENT & CLOSURE:

Check for understanding with questions:

- “What does increasing ISO do to your image quality?”
- “Why is shutter speed important for capturing motion?”
- “What are the advantages of using RAW files over JPEG?”

Exit ticket: Write down two camera settings that affect exposure and explain their roles in one sentence each.

Rubric criteria:

- Correct identification of ISO, shutter speed, aperture (3 marks)

- Proper explanation of memory card use and file formats (2 marks)
- Ability to adjust camera settings for a given scenario (5 marks)

Transition: Next lesson will cover composition basics and framing techniques.

QUICK REVISION BULLETS:

• Digital cameras use electronic sensors (CCD or CMOS) to capture images.

• ISO controls sensor sensitivity; higher ISO increases brightness and noise.

• Shutter speed controls exposure time; faster speeds freeze action, slower speeds blur motion.

• Aperture affects light entry and depth of field; lower f-stop = wider opening.

• Memory cards store images; SD cards are most common with capacities from 8GB to 256GB.

• JPEG files are compressed; RAW files store unprocessed sensor data for editing.

EXAM PRACTICE:

- (4-mark) Describe two effects of changing the shutter speed on a digital photograph.

- (8-mark) Explain why aperture settings affect both exposure and depth of field in digital photography.
- (12-mark) ‘Using RAW files is essential for professional digital photography.’ How far do you agree?

EXAM TIPS:

- Always include specific camera settings and their values when answering questions.
- Use technical terms such as “sensor sensitivity,” “exposure time,” and “depth of field” correctly.
- For longer answers, explain cause and effect clearly, e.g., “Increasing ISO brightens the image but adds digital noise.”
- Compare file types with examples of their use cases (JPEG for quick sharing, RAW for editing).

REMEMBER:

• ISO = sensor sensitivity; keep low for less noise.

• Shutter speed = exposure duration; controls motion capture.

• Aperture = lens opening; controls light and focus range.

• Memory cards must be formatted before use to prevent data errors.

• RAW files retain full image data; JPEG files are compressed for smaller size.

CHAPTER 2

Mastering Camera Settings and Modes

LESSON OBJECTIVES

By the end of this lesson, students will:

- Understand essential camera settings: aperture, shutter speed, ISO, white balance, and focus modes.
- Identify and use key shooting modes: Auto, Program, Aperture Priority, Shutter Priority, and Manual.
- Align camera settings with photography competency standards for exposure control and image quality.
- Use digital cameras and camera manuals effectively.

  Materials required: Digital camera (DSLR or mirrorless), camera manual, tripod (optional).

  Lesson duration: 60 minutes.

  ### I DO (DIRECT INSTRUCTION)

  Begin by explaining the exposure triangle: aperture, shutter speed, and ISO control light entering the camera. Display a camera interface or diagram:

- Aperture: Controls the lens opening size, measured in f-stops (e.g., f/2.8, f/16). Lower f-stop means wider opening, more light,

and shallower depth of field.

- Shutter speed: Duration the sensor is exposed to light, measured in seconds or fractions (e.g., 1/500, 1/30). Faster speeds freeze motion; slower speeds create motion blur.
- ISO: Camera sensor sensitivity to light. Lower ISO (100-200) is less sensitive, producing less noise; higher ISO (1600+) increases sensitivity but adds grain.

Demonstrate white balance settings to adjust color temperature for different lighting (daylight, tungsten, fluorescent). Show focus modes: manual focus vs. autofocus, including Single (AF-S) and Continuous (AF-C).

Introduce shooting modes:

- Auto: Camera sets all parameters automatically.
- Program (P): Camera sets aperture and shutter speed; user controls ISO and white balance.
- Aperture Priority (A or Av): User selects aperture; camera sets shutter speed.
- Shutter Priority (S or Tv): User selects shutter speed; camera sets aperture.
- Manual (M): User controls all settings manually.

Use the camera screen or viewfinder to show these modes and their effects on exposure and depth of field. Emphasize the link between settings and creative control.

WE DO (GUIDED PRACTICE)

Together, adjust camera settings to achieve correct exposure in varied lighting conditions. Prompt: "Set aperture at f/4 for a blurred background." Hint: Lower f-stop widens aperture. Next, "Change shutter speed to 1/250 to freeze motion." Confirm correct setting by observing exposure meter feedback.

Practice switching between Auto, Program, and Aperture Priority modes. Observe how the camera adjusts parameters in each mode. Answer Key:

- Aperture at f/4 with shutter speed 1/250 and ISO 200 = well-exposed image with shallow depth of field.
- Auto mode adjusts all automatically; Program lets ISO change manually.

Check understanding by asking: "What happens to depth of field if aperture changes from f/16 to f/2.8?" (Answer: Depth of field becomes shallower; background blurs more).

YOU DO (INDEPENDENT PRACTICE)

Task: Using your camera, photograph three subjects in different lighting: bright daylight, indoor low light, and moving object. For each, select an appropriate shooting mode and manually adjust at least two settings to optimize exposure and creative effect.

Success criteria:

- Correct exposure achieved without over- or underexposure.
- Use of aperture to control depth of field.
- Use of shutter speed to control motion capture.

Differentiation:

- Scaffolded option: Use Aperture Priority mode and adjust only aperture and ISO.
- Challenge option: Use Manual mode and adjust aperture, shutter speed, and ISO independently.

Submit images with brief notes on chosen settings and rationale.

ASSESSMENT & CLOSURE

Check for understanding with quick questions:

- What effect does increasing ISO have on image quality?
- Which mode allows full manual control of exposure?
- How does shutter speed affect motion capture?

Exit ticket: Write down one shooting mode and two camera settings you would use for photographing a fast-moving subject outdoors.

Rubric criteria:

- Demonstrates correct use of camera modes (Auto, A, S, M).
- Explains impact of aperture, shutter speed, and ISO on exposure and image effect.
- Applies appropriate settings in practical scenarios.

Transition: Next lesson covers composition techniques building on camera control skills learned here.

QUICK REVISION BULLETS:

• Aperture controls light entry and depth of field; lower f-stop = wider aperture, shallow depth of field.

• Shutter speed controls exposure time; fast speeds freeze motion, slow speeds blur motion.

• ISO adjusts sensor sensitivity; higher ISO increases noise.

• White balance corrects color casts from lighting types (daylight, tungsten, fluorescent).

• Autofocus modes: AF-S (single), AF-C (continuous), Manual focus.

• Shooting modes: Auto (full auto), Program (auto aperture/shutter), Aperture Priority (user sets aperture), Shutter Priority (user sets shutter speed), Manual (user sets all).

KEY TERMS:

• **APERTURE**: Lens opening size controlling light and depth of field.

• **SHUTTER SPEED**: Time sensor is exposed to light; measured in seconds/fractions.

• **ISO**: Sensor sensitivity to light, affecting brightness and noise.

• **WHITE BALANCE**: Camera setting adjusting color temperature to match light source.

• **SHOOTING MODES**: Camera presets that determine automatic/manual control over exposure settings.

CASE STUDY: USING APERTURE PRIORITY MODE FOR PORTRAIT PHOTOGRAPHY

A photographer selects Aperture Priority mode with aperture set at f/2.8 to create a blurred background effect, isolating the subject. The camera automatically adjusts shutter speed to maintain exposure. In low light, ISO is increased to 800 to avoid underexposure. The result is a sharp subject with soft background bokeh, demonstrating practical control of depth of field and exposure through camera settings.

EXAM PRACTICE:

- (4-mark) Describe two effects of changing the aperture setting on a photograph.
- (8-mark) Explain why a photographer might choose Shutter Priority mode when photographing sports events.
- (12-mark) "Manual mode provides better creative control than Auto mode." How far do you agree? Use examples of camera settings in your answer.

EXAM TIPS:

• Always include specific camera settings and their effects in your answers.

• Use correct technical terms: aperture, shutter speed, ISO, white balance.

• For longer questions, explain cause and consequence: e.g., changing aperture affects depth of field, which impacts subject-background separation.

• Avoid vague terms like "blur" without specifying how aperture or shutter speed causes it.

REMEMBER:

• Aperture (f-stop), shutter speed (seconds), and ISO form the exposure triangle.

• Lower f-stop = wider aperture; higher ISO = more noise.

• Shooting modes control user vs. automatic setting adjustments.

• White balance prevents unwanted color casts in photos.

• Autofocus modes impact focus accuracy for still vs. moving subjects.