

# **International Association of Bloodstain Pattern Analysts**

## **Bloodstain Pattern Analysis Basic Course**

### Course Requirements

**Purpose.** A course of instruction designed for investigators, crime scene technicians, forensic technicians, and others involved in criminal and medical-legal investigations and crime scene analysis. The course is intended to develop a fundamental knowledge of the discipline of bloodstain pattern analysis. The course should illustrate to the student basic principals of bloodstain pattern analysis and the practical application of the discipline to actual casework. The course syllabus is not intended to create an “instant” expert.

**Course Objectives.** Upon completion of the course the student should:

- Demonstrate knowledge of the development, history and advancement of bloodstain pattern analysis.
- Demonstrate knowledge of the inherent limitations of bloodstain pattern analysis.
- Recognize key bloodstain patterns and understand the mechanism by which they are created.
- Determine impact angles for individual bloodstains.
- Determine a probable point (area) of convergence for a group of bloodstains.
- Demonstrate the ability to combine point (area) of convergence with impact angle to locate the probable point of origin for a given blood spatter event.
- Recognize proper protective measures to follow in a bloodstained scene.
- Demonstrate knowledge of the methods of documenting bloodstain scenes, both photographically and in written format.
- Demonstrate an ability to evaluate a basic bloodstain pattern scene.

**Course Length.** The course of instruction should be a minimum of forty hours in length.

**Course Content.** The course should include instruction in the following areas:

**I. Introduction to Bloodstain Pattern Analysis.** A discussion and lecture designed to introduce the student to the basic tenets of bloodstain pattern analysis, its function and purpose as a forensic discipline, as well as a historical review of its development.

*This section should include lecture directed at:*

1. The purpose and function of bloodstain pattern analysis in a modern investigation.
2. The history of bloodstain pattern analysis, including the formation and purpose of the International Association of Bloodstain Pattern Analysts.

3. The application of basic scientific method in bloodstain pattern analysis. To include:
  - a. What scientific method entails.
  - b. How to develop objective case oriented experiments.
4. A discussion of biohazards associated with bloodstain patterns and the appropriate personal protection techniques.
5. Characteristics of liquid blood and blood droplets under force:
  - a. The general nature of liquids and in particular the incompressibility of liquids.
  - b. The effects of surface tension on individual droplets and pools of blood.
  - c. The effects of terminal velocity on free falling droplets.
6. Characteristics of blood droplets on impact:
  - a. The effect of the volume on individual droplets.
  - b. The effect of target surface characteristics.
  - c. Limitations of determining distance fallen for individual droplets.
  - d. The relationship of angle of impact to stain shape.
7. Limitations in bloodstain pattern analysis conclusions.
  - a. General conclusion information (consistent, inconsistent).
  - b. Impact angle determinations.
  - c. Point of origin determinations.
  - d. Pattern transfer determinations (consistent v. identification).

**II. Recognition and Creation of Basic Stain Patterns.** A combination of lecture and practical designed to lead the student through a primarily hands-on process of the cause and effect relationships that exist with regard to the creation of bloodstain patterns.

*This section should include lecture and practical directed at understanding:*

1. Passive Stains:
  - a. Drip Patterns.
  - b. Flow Patterns.
  - c. Pools.
  - d. Saturation stains.
2. Projected and Impact Spatter stains:
  - a. Impact Patterns.
  - b. Splashes.
  - c. Cast-off Patterns.
  - d. Arterial Spurt and Gush Patterns.

- e. Expired Bloodstain Patterns.
3. Transfer Stains:
- a. Wipe Patterns.
  - b. Swipe Patterns.
  - c. Transfer/Contact Patterns.
4. Misc. Patterns:
- a. Void Patterns.
  - b. Fly Spot Patterns.
  - c. Bubble Rings.
  - d. Perimeter/Skeletonized Bloodstains.

**III. Point (Area) of Origin Determinations.** Lecture and practical exercises that lead the student through the process of establishing the probable point (area) of origin for an impact pattern and the various methods available to an analyst to make the point (area) of origin determination.

*This section should include at the minimum, both lecture and a pass or fail practical that requires each student to:*

1. Evaluate and select appropriate stains for inclusion (considering stain shape, stain location in the pattern, and number of stains).
2. Evaluate and determine the impact angle for a variety of well-formed bloodstains, to an acceptable error level of +/- five degrees.
3. Recognize and determine directionality in a variety of bloodstain shapes.
4. Evaluate and determine point (area) of convergence.
5. Apply “stringing” and/or mathematical methods for point (area) of origin determinations.
6. Understand the limitations of point (area) of origin determinations, recognizing when point (area) of origin determinations are either impractical or impossible.
7. Discuss and if possible use, forensic software designed for making point (area) of origin determinations.

**IV. Correlation of Bloodstain Pattern Analysis With Other Forensic Evidence.** Lecture and demonstration with examples of how bloodstain pattern analysis must fit with other known evidence, using a holistic approach.

*This section should include at a minimum:*

1. The use and limitations of presumptive tests for blood.
2. The importance of identification of bloodstain patterns to a specific source through DNA/Serology technology.
3. The correlation of bloodstain patterns to wound pathology.
4. The sequencing of bloodstain pattern events.

**V. Documenting Bloodstain Patterns.** Lecture and practical demonstrating current methods of photography, report writing, diagramming and the function of additional enhancement techniques (e.g. luminol).

*This section should include:*

1. Demonstration of photography techniques, illustrating the use of overall, mid-range and close-up photographs to document bloodstain patterns.
2. Proper use of scale and other photography enhancement devices (e.g. ABFO scales, Roadmapping techniques, stain labeling)
3. General discussion of latent blood visualization using chemicals.
4. Report writing techniques.
5. General discussion of presenting bloodstain pattern analysis testimony at legal proceedings.

**VI. Associated Practical Exercises.** The course at a minimum will include the following practical exercises:

1. **Stain Shape as a Function of Impact Angle.** Production of stains at varying angles between 10-90 degrees on different surfaces. Demonstrating the reproducibility of the various stain shapes and the effect of surface characteristics on those shapes.
2. **Diameter of Individual Stains as a Function of Distance Fallen and Droplet Volume.** Production of a variety of droplets from various distances and of different droplet volumes and surface characteristics, illustrating the

limitations present in evaluating distance fallen.

3. **Creation and Causation of Cast-off Patterns.** Production of cast-off patterns by various objects. Illustrating the mechanism and limitations in evaluation of cast-off pattern stains.
4. **Creation of Impact Spatter Resulting From Blunt Trauma Force.** The creation and evaluation of spatter resulting from force associated with physical blows. The practical should demonstrate clearly the correlation of force to spatter size and its effect on: variance in the range of stain sizes for a given pattern, preponderant stain size, and stain distribution.
5. **Creation of Impact Spatter Resulting From Explosive Force.** The creation and evaluation of spatter resulting from gunshot. The practical should show the correlation between spatter dispersion and source-to-target distance and the differences between forward spatter and back spatter.
6. **Creation of Projected Blood Patterns.** Creation of spurt and gush type stains both on vertical and horizontal targets.
7. **Creation of Transfer Patterns.** The creation of a variety of transfer pattern stains using various objects. Demonstrating the limitations present in the recognition and individualization of transfer patterns.
8. **Creation and Recognition of Blood Trails.** Creation of blood trails under various conditions, showing the correlation of horizontal motion of blood at various speeds to the resulting individual stain shapes.
9. **Drying Times of Blood.** A practical demonstrating the process of blood droplet drying times in relation to stain size.

**VII. Administrative Requirements.** The course should provide or include the following:

1. A pretest designed to test the students understanding of the key objectives.
2. A practical based or written examination process designed to test the student's comprehension of the key objectives.
3. A course handbook or manual, which describes the practical exercises and provides space for writing notes and observations.
4. The creation of individual standards of key bloodstains patterns, by each student.

5. A certificate of completion describing the dates of training, the number of hours completed, the name of the instructor(s) and the location of training.
6. A course evaluation form, maintained by the instructor.