Purpose: A course of instruction designed for investigators, crime scene technicians, forensic analysts, and others involved in criminal and medical-legal investigations and crime scene analysis. This course builds upon the basic principles and practical skills acquired in the basic 40-hour course for more complex applications of bloodstain pattern analysis (BPA). Additional training will focus on the interpretation of bloodstain evidence, evaluation and documentation of bloodstain patterns on moveable and flexible objects and surfaces (e.g. clothing articles, carpet, curtains, etc.), physics of bloodstain formation, event analysis, report preparation, and court presentation techniques. Successful completion of the course is not sufficient to qualify the student as an expert in bloodstain pattern analysis.

Prerequisites:

- An IABPA-approved Basic Bloodstain Pattern Analysis Course (40 hours);
- Student must work with a mentor on at least three (3) bloodstain cases before taking this class. Types of cases will be left to the instructor of the advanced class.

Strongly recommended:

- College level basic trigonometry and college level basic physics classes OR a class similar to the current Math & Physics for Bloodstain Pattern Analysis.

Course Objectives

Upon completion of the course the student will be able to:

- Relate characteristics of bloodstain pattern types to the mechanism of stain production
- Demonstrate the methodology of BPA within the context of the overall scene
- Demonstrate the ability to use various methods to establish the area of origin of an impact pattern and discuss various computer programs that can be used in area of origin determination
- Demonstrate the ability to evaluate bloodstain patterns on moveable and flexible objects and surfaces
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- Formulate bloodstain pattern evidence into a report format which complies with scientific and jurisdictional standards
- Demonstrate the ability to review another analyst’s work (technical and administrative review)
- Knowledge and understanding of the use of chemical enhancement and detection techniques for latent or partial bloodstains
- Demonstrate the ability to evaluate complex bloodstain pattern scenes
- Apply knowledge in presenting BPA testimony and evidence in the courtroom
- Demonstrate an understanding of the properties of blood and how they relate to bloodstain pattern analysis, particularly the physics of bloodstain formation

Course Length
The required course length should consist of at least 80 hours of structured learning activities, and must include a minimum of 40 hours of instructor-led instruction, to include lecture and hands-on experiments. Students must complete selected readings and activities prior to the instructor-led portion, and may be expected to complete written exercises and/or complete a proctored exam within a specified date following the instructor-led instruction.

Course Content
The course must include instruction in the following areas:

I. Bloodstain Pattern Terminology and Identification
This section must include lecture and discussion directed at:
   1. Review of basic bloodstain pattern identification
   2. Review of terminology used to describe bloodstains and bloodstain patterns

II. Physics of Bloodstain Formation
This section must include lecture and discussion directed at:
   1. Projectile Motion
   2. Physical forces/transfer of energy
   3. Influence of viscosity/surface tension/adhesion/cohesion
   4. Droplet oscillation
   5. Effects of air resistance on the flight of a blood droplet
   6. Vector analysis as it relates to stain formation
   7. Fluid dynamics as it relates to stain formation
III. Area of Origin Determinations
This section must include lecture and practical exercise directed at:
1. String method
2. Tangent method
3. Discuss available software programs
4. Illustration methods
   a. diagrams
   b. tables and graphs
   c. photographs
5. Evaluation and limitations of techniques

IV. Moveable and Flexible Objects and Surfaces Examinations
This section must include lecture and practical exercise directed at:
1. Methodology and equipment needed for proper evaluation
2. Bloodstains on different types of moveable and flexible objects and surfaces
   a. the effects of fabric texture and absorption
   b. distortion of bloodstains
   c. issues of fabric saturation
   d. evaluating spatter vs. contact stains
   e. macro/microscopic examination
   f. weapons
3. Documentation and photographic techniques, including infra-red (IR) photography
4. Determining directionality and understand the problems and limitations posed with different fabric types
5. Alterations to bloodstains

V. Complex Pattern Analysis
This section must include lecture and practical exercise directed at:
1. Principles for evaluating mixed bloodstain patterns and sequencing events
2. Pattern recognition of mixed bloodstain patterns
3. Macro- and microscopic examinations of bloodstains to determine sequence of overlapping stains
4. Multiple areas of origin
5. Scenes with limited information
6. Limitations of sequencing events
VI. Chemical Enhancements and Detection
This section must include lecture directed at:
1. Consideration and prioritization of chemical enhancement techniques of latent or partial bloodstain patterns (what will provide the best evidence)
2. Application of the appropriate chemical enhancement (the right chemical for the job)
3. DNA consideration other physical evidence consideration

VII. Reporting, Conclusions, and Peer Review
This section must include lecture and practical exercise directed at:
1. Reporting and conclusion related to bloodstain patterns and scene analysis:
   a. Description vs. conclusion
   b. Inductive vs. deductive arguments
   c. BPA and event analysis
2. Technical and administrative review:
   a. how to conduct a technical and administrative review
   b. benefits of technical and administrative review

VIII. Experimentation and Hypothesis
This section must include lecture and practical exercise directed at experimentation:
1. how to design a scientific experiment
   a. scenario-based question experimentation
   b. empirical data-based experimentation
2. methods of documentation
3. how to report findings
4. awareness of bias

IX. Courtroom Presentations and Testimony
This section must include lecture and discussion directed at:
1. Computer generated diagrams and graphic illustrations
   a. various software programs
   b. general scene reconstruction
   c. area of origin determination
   d. use of two-dimensional and three-dimensional formats
2. Cautions and limitations
3. Appropriate use and reporting
4. Meeting jurisdictional court admissibility standards
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5. Conclusions and opinions
6. History of BPA and standards in forensic community
7. Expert witness etiquette

This section must finish with a mock court.

X. Administrative Requirements

This course must provide or include the following:

1. A practical exercise and written examination designed to test the student’s comprehension of the course objectives.
2. A course handbook or manual, which describes the practical exercises and provides space for writing notes and observations.
3. A certificate of completion describing the dates of training, the number of hours completed, the name(s) of the instructor(s), and the location of the training.
4. A course evaluation form, maintained by the instructor(s).