

# SYLLABUS

Course: Fire Investigation and Analysis

COURSE & SECTION: FES 4685

CREDIT HOURS: 3

SESSION: FALL 2019

\*\* ON-LINE

\*\* THERE WILL BE TIMES SCHEDULED FOR ON-LINE MEETINGS.

**INSTRUCTOR:** *Dr. Chris Reynolds, Ed.D., CEM, CFO, EFO, MEMS*

*Office Rinker School of Construction Management*

*Rinker 303*

[Chris.Reynolds@ufl.edu](mailto:Chris.Reynolds@ufl.edu)

*813-309-1948*

Bio for Chris Reynolds, Ed.D., CEM, EFO, CFO, MEMS

Dr. Chris Reynolds has extensive civilian and military emergency management and homeland security experience. He retired in 2010 from a large civilian Fire-Rescue department after serving 33 years, rising to the rank of Division Chief and Shift Commander. He also retired in 2014 from the United States Air Force as a Lieutenant Colonel, where he was an Emergency Preparedness Liaison Officer (EPLO) assigned to the Defense Support of Civilian Authorities (DSCA) Command Cell, 1st Air Force (Air Forces Northern), Tyndall Air Force Base, Fla. Air Force EPLOs support the designated combatant commander and lead federal agencies to assist in coordinating military support to local, state and federal agencies involved in domestic incident management. He is a certified emergency manager (CEM) through the International Association of Emergency Managers (IAEM) and has commanded numerous multi-alarm/multi-agency emergency scenes, mass casualty, and hazardous materials emergencies. He was deployed to the Oklahoma City Bombing in 1995, assisting the FEMA Incident Support Team (IST) on site.

In his military role, he deployed to New Orleans in the aftermath of Hurricane Katrina as the officer in command of an aeromedical evacuation liaison team (AELT) that was a part of Joint Task Force (JTF) Katrina and coordinated joint civilian/military airlift of over 20,000 evacuee's and 4,500 casualties. Most recently, Lt. Col. Reynolds was deployed in support of JTF Haitian Earthquake and coordinated the repatriation of Haitian casualties in the South Florida AOR. Lt. Col. Reynolds was among the first mobilized in the aftermath of the September 11th attacks in 2001 and deployed as the commanding officer of an AELT to two classified forward locations in the Afghanistan/Pakistan area. His Team coordinated the medical evacuation of US and coalition combat casualties and directly supported combat search and rescue (CSAR) operations. His Team was recognized by the Department of

Defense and awarded the valor "V" device for their efforts. In 1995, he deployed to Haiti during OPERATION UPHOLD DEMOCRACY and coordinated rotary lift-aeromedical evacuation between Port A' Prince and the USNS Comfort.

**OFFICE HOURS:** *I am available anytime between 9 AM and 3 PM daily. You can email me any time.*

**\*\*COURSE WEBSITE:** <http://lss.at.ufl.edu>

**\*\* COURSE COMMUNICATIONS:** There is a General Discussion tab that can be used, or send me an email through the course email.

**REQUIRED TEXT:** Forensic Fire Scene Reconstruction, 3<sup>rd</sup> Edition (2012); Icove/DeHaan/Haynes; Brady Publishing ISBN 0132956209

**\*\*ADDITIONAL RESOURCES:** *Use resources on the course site under the Resource tab*

**\*\*COURSE DESCRIPTION:** This course examines the technical, investigative, legal, and social aspects of arson, including principles of incendiary fire analysis and detection, environmental and psychological factors of arson, legal considerations, intervention, and mitigation strategies.

**\*\*PREREQUISITE KNOWLEDGE AND SKILLS:** *None*

**PURPOSE OF COURSE:** This course prepares the student to recognize and apply best practices in the investigation of fires, to conduct the origin and cause determination procedures and practices necessary to ascertain if the fire was accidental or incendiary, to prepare the investigative reports necessary to document such analysis, and to apply the findings and knowledge acquired

through such efforts to reduce the consequence of both accidental and intentional fires.

**COURSE GOALS AND/OR OBJECTIVES:** *By the end of this course, students will:*

1. *Demonstrate a technical understanding of the characteristics and impacts of fire loss and the crime of arson necessary to conduct competent fire investigation and analysis.*
2. *Document the fire scene, in accordance with best practice and legal requirements.*
3. *Analyze the fire scenario utilizing the scientific method, fire science, and relevant technology.*
4. *Analyze the legal foundation for conducting a systematic incendiary fire investigation and case preparation.*
5. *Design and integrate a variety of arson related intervention and mitigation strategies*

**\*\* HOW THIS COURSE RELATES TO THE STUDENT LEARNING OUTCOMES IN THE FIRE EMERGENCY SERVICES PROGRAM:** *Demonstrate strong verbal and written communication skills for leadership in fire and emergency services. Illustrate knowledge and legal application of safety, health and environmental regulations at state and federal levels.*

**\*\*TEACHING PHILOSOPHY:** *I am looking for students to demonstrate a working knowledge of the subject. You need to be creative when you complete your assignments but maintain a professional appearance of your work. Your work needs to be complete and in such a manner that someone can pick up your document and understand what you are trying to convey. And most of all your work needs to be supported with research and cited in properly in APA format.*

**\*\*INSTRUCTIONAL METHODS:** *The course is designed for individual and group interactivity. It is important to post and respond to discussion questions in the course within the time frame allotted. This provides a learning environment by networking with other students in the course. The assignments are individual base to give you the opportunity to do a variety of activities, in many cases, similar to what you will be doing in role as a leader in the emergency services profession.*

## COURSE POLICIES:

**ATTENDANCE POLICY:** *The course is designed in module format. You should check the site at least once a week. You are required to complete the assignments including discussion questions within the time period designated on the module. There will be meetings set up throughout the course. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at:*

*<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.*

**\*\*QUIZ/EXAM POLICY:** *There is a final paper for this course. There are no exams or quizzes.*

**MAKE-UP POLICY:** *You must contact me if you are going to be late on any assignment to receive credit.*

**\*\*ASSIGNMENT POLICY:** *All assignments have a due date. Please be sure to check the date and time it is due in each module.*

**\*\*LATE ASSIGNMENT & DISCUSSION POLICY:**

*Assignments 48 hours late will receive a 10% deduction in their grade.*

- \* Assignments more than 48 hours but less than 30 days late will receive a 20% deduction in their grade.*
- \* Assignments more than 30 days late but submitted during the semester will receive a 50% deduction in their grade.*
- \* Discussions more than 48 hours late will receive a 25% deduction in their grade.*
- \* Discussions more than 48 hours later will receive a 50% deduction in their grade.*

**\*\*COURSE TECHNOLOGY:** *Class meetings will require a web camera and mic/audio. If you are not able to use a web camera you will need to at least provide audio/mic, you can call in on a phone also.*

## UF POLICIES:

**UNIVERSITY POLICY ON ACCOMMODATING STUDENTS WITH DISABILITIES:** Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

**UNIVERSITY POLICY ON ACADEMIC MISCONDUCT:** Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at <http://www.dso.ufl.edu/students.php>.

**\*\*NETIQUETTE: COMMUNICATION COURTESY:** All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. [Describe what is expected and what will occur as a result of improper behavior] <http://teach.ufl.edu/docs/NetiquetteGuideforOnlineCourses.pdf>

### **\*\* UF'S HONESTY POLICY**

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obliged to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor of in this class.

## GETTING HELP:

For issues with technical difficulties for E-learning in Sakai, please contact the UF Help Desk at:

- [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu)

- (352) 392-HELP - select option 2
- <https://lss.at.ufl.edu/help.shtml>

\*\* Any requests for make-ups due to technical issues MUST be accompanied by the ticket number received from LSS when the problem was reported to them. The ticket number will document the time and date of the problem. You MUST e-mail your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

Other resources are available at <http://www.distance.ufl.edu/getting-help> for:

- Counseling and Wellness resources
- Disability resources
- Resources for handling student concerns and complaints
- Library Help Desk support

Should you have any complaints with your experience in this course please visit <http://www.distance.ufl.edu/student-complaints> to submit a complaint.

## COURSE SCHEDULE:

Week	Topics	Objectives	Readings	Assignment
1	<ul style="list-style-type: none"> <li>Introduction – online post</li> <li>Principles of Reconstruction</li> <li>The Scientific Method - Foundations of Expert Testimony - Recognition of Fire Investigation as a Science</li> </ul>	<ol style="list-style-type: none"> <li>1. Compare &amp; contrast various working hypotheses.</li> <li>2. Critique the federal rules of evidence.</li> <li>3. Analyze error rates, professional standards, and acceptability.</li> </ol>	<ul style="list-style-type: none"> <li>Forensic Fire Scene Reconstruction - p1 through p35</li> </ul>	<ol style="list-style-type: none"> <li>1. Discuss the pros and cons of the scientific method when conducting a fire investigation.</li> <li>2. Provide a substantive response to a fellow student colleague. Don't just agree or disagree-- provide a substantive response or in support or non-support.</li> </ol>
2	<ul style="list-style-type: none"> <li>Forensic Fire Scene Reconstruction - Benefits of Fire Engineering Analysis</li> </ul>	<ol style="list-style-type: none"> <li>1. Analyze fire patterns.</li> <li>2. Interpret the most common methods of heat transfer.</li> <li>3. Assess the various starting conditions.</li> </ol>	<ul style="list-style-type: none"> <li>Forensic Fire Scene Reconstruction - p35 through p49</li> </ul>	<ol style="list-style-type: none"> <li>1. Discuss the 6 steps in Forensic Fire Scene Reconstruction. Which step do you consider the most critical? Explain why.</li> <li>2. Provide a substantive response to a fellow student colleague. Don't just agree or disagree-- provide a substantive response or in support or non-support.</li> </ol>

3	<ul style="list-style-type: none"> <li>Basic Fire Dynamics - The Science of Fire - Heat Transfer - Fire Development - Enclosure Fire</li> </ul>	<ol style="list-style-type: none"> <li>1. Assess the benefits of fire engineering analysis.</li> <li>2. Analyze combustion efficiency.</li> <li>3. Interpret the fire development phases."</li> </ol>	<ul style="list-style-type: none"> <li>Forensic Fire Scene Reconstruction - p54 through p94</li> </ul>	<ol style="list-style-type: none"> <li>1. Discuss two fire dynamic elements that can make conducting forensic fire scene reconstruction more difficult. In your discussion, be sure to provide an example.</li> <li>2. Provide a substantive response to a fellow student colleague. Don't just agree or disagree-- provide a substantive response or in support or non-support."</li> </ol>
4	<ol style="list-style-type: none"> <li>1. Paper 1</li> <li>2. Additional Reading</li> </ol>	<ol style="list-style-type: none"> <li>1. Synergize the topics of the previous three weeks and demonstrate an understanding of the key points.</li> </ol>	<ul style="list-style-type: none"> <li>(Additional Reading) <i>Full Scale Room Burn Pattern Study</i></li> </ul>	<ol style="list-style-type: none"> <li>1. Prepare a five (5) page paper discussing the impacts fire engineering analysis and an understanding of fire dynamics has had on fire investigation and analysis. In your discussion, be sure to explain why firm foundations in both fire analysis and fire dynamics is so important to the investigator.</li> </ol>
5	<ul style="list-style-type: none"> <li>Fire Pattern Analysis - Plume Models - Plume Calculations - Fire Patterns</li> </ul>	<ol style="list-style-type: none"> <li>1. Interpret burn pattern analysis.</li> </ol>	<ul style="list-style-type: none"> <li>Forensic Fire Scene Reconstruction - p97 through p132</li> <li>(Additional Reading) <i>Hourglass Burn Patterns-A Scientific Explanation for Their Formation</i></li> </ul>	<ol style="list-style-type: none"> <li>1. Discuss why the fire plume is the most important factor in fire scene reconstruction. In your discussion, describe what ""patterns"" can tell the investigator.</li> <li>2. Provide a substantive response to a fellow student colleague. Don't just agree or disagree-- provide a substantive response or in support or non-support."</li> </ol>



6	<ul style="list-style-type: none"> <li>Fire Pattern Analysis - Interpreting Fire Plume Behavior - Fire Burn Patterns</li> </ul>	<ol style="list-style-type: none"> <li>Interpret fire vectoring.</li> <li>Determine point of origin.</li> <li>Analyze heat release rates.</li> </ol>	<ul style="list-style-type: none"> <li>Forensic Fire Scene Reconstruction - p132 through p146</li> <li>(Additional Reading) <i>Using Fire Modeling to Understand Fire Behavior</i></li> </ul>	<ol style="list-style-type: none"> <li>Discuss why the consolidated fire and smoke transport (CFAST) and the fire dynamic simulator (FDS) models. In your discussion, identify which of the two is more useful in fire scene reconstruction.</li> <li>Provide a substantive response to a fellow student colleague. Don't just agree or disagree-- provide a substantive response or in support or non-support."</li> </ol>
7	<ul style="list-style-type: none"> <li>Fire Scene Documentation - National Protocols - Exterior - Interior - Investigative</li> </ul>	<ol style="list-style-type: none"> <li>Analyze damage documentation.</li> <li>Determine the effectiveness of witness statements.</li> <li>Determine the effectiveness and use of photography.</li> </ol>	<ul style="list-style-type: none"> <li>Forensic Fire Scene Reconstruction - p151 through p173</li> <li>(Additional Reading) <i>Fire Scene Reconstruction</i></li> <li>(Additional Reading) <i>Organizing and Completing Fire Scene Examination with Multiple Interested Parties</i></li> </ul>	<ol style="list-style-type: none"> <li>Discuss the importance of properly determining the correct interested parties when conducting a fire investigation. Refer to the "Organizing and Completing Fire Scene Examination with Multiple Interested Parties" paper when preparing your post.</li> <li>Provide a substantive response to a fellow student colleague. Don't just agree or disagree-- provide a substantive response or in support or non-support."</li> </ol>
8	<ul style="list-style-type: none"> <li>Paper</li> </ul>	<ol style="list-style-type: none"> <li>Synergize the topics of the previous three weeks and demonstrate an understanding of the key points.</li> </ol>	<ul style="list-style-type: none"> <li>No Additional Reading</li> </ul>	<ol style="list-style-type: none"> <li>Prepare a five (5) page paper discussing the importance of fire scene reconstruction. In your discussion, explain the impact of the scientific method on fire investigations and the benefits afforded to the investigator.</li> </ol>

9	<ul style="list-style-type: none"> <li>Fire Scene Documentation - Photography - Criminalistics - Sketching - Time Establishment</li> </ul>	<ol style="list-style-type: none"> <li>1. Assess the importance of photography as a tool.</li> <li>2. Analyze the impact of Trace evidence.</li> <li>3. Demonstrate the impact of time during investigations.</li> </ol>	<ul style="list-style-type: none"> <li>Forensic Fire Scene Reconstruction - p173 through p219</li> <li>(Additional Reading) <i>Fundamentals of Digital Photography for Fire Investigators</i></li> </ul>	<ol style="list-style-type: none"> <li>1. Discuss the sequential and mosaics methods of fire scene photography.</li> <li>2. Provide a substantive response to a fellow student colleague. Don't just agree or disagree-- provide a substantive response or in support or non-support.</li> </ol>
10	<ul style="list-style-type: none"> <li>Arson Crime Scene Analysis - Arson as a Crime - Classification of Motive - Serial Arson</li> </ul>	<ol style="list-style-type: none"> <li>1. Assess the need for developing a working hypothesis.</li> <li>2. Analyze the various motive classifications.</li> <li>3. Determine the geography of arson.</li> </ol>	<ul style="list-style-type: none"> <li>Forensic Fire Scene Reconstruction - p224 through p260</li> <li>(Additional Reading) <i>The Six Motives of Firesetting</i></li> </ul>	<ol style="list-style-type: none"> <li>1. Discuss the six classifications of firesetting. In your discussion, identify which of the six you believe are the most dangerous.</li> <li>2. Provide a substantive response to a fellow student colleague. Don't just agree or disagree-- provide a substantive response or in support or non-support.</li> </ol>
11	<ul style="list-style-type: none"> <li>Fire Modeling - Zone Modeling - Guidelines and Standards Impact - Case Studies</li> </ul>	<ol style="list-style-type: none"> <li>1. Assess the various fire models.</li> <li>2. Analyze the impact of fluid dynamics on fire suppression and investigation.</li> <li>3. Demonstrate an awareness of</li> </ol>	<ul style="list-style-type: none"> <li>Forensic Fire Scene Reconstruction - p263 through p305</li> <li>(Additional Reading) <i>An Updated International Survey of Computer Models for Fire and Smoke</i></li> </ul>	<ol style="list-style-type: none"> <li>1. After reading the article, "An Updated International Survey of Computer Models for Fire and Smoke", select one model and describe it in detail.</li> <li>2. Provide a substantive response to a fellow student colleague. Don't just agree or disagree-- provide a substantive response or in support or non-support.</li> </ol>

		verification and validation studies."		
12	<ul style="list-style-type: none"> <li>Paper</li> <li>Additional Reading</li> </ul>	1. Synergize the topics of the previous three weeks and demonstrate an understanding of the key points.	<ul style="list-style-type: none"> <li>(Additional Reading) <i>The Fire Modeling Process Power Point</i></li> </ul>	1. Prepare a five (5) page paper discussing the importance of fire modeling in investigations. In your discussion, explain the impact fire modeling has had in fire investigations.
13	<ul style="list-style-type: none"> <li>Fire Death and Injuries - Tenability - Toxic Gases - Heat - Visibility - Time Intervals</li> </ul>	<p>"1. Analyze the toxic gases produced in the combustion process.</p> <p>2. Assess the effects of heat and flame on combustibles</p> <p>3. Determine the impact of time intervals."</p>	<ul style="list-style-type: none"> <li>Forensic Fire Scene Reconstruction - p308 through p349</li> <li>(Additional Reading) <i>Recovery and Interpretation of Burned Human Remains</i></li> </ul>	<p>1. After reading the article, "Recovery and Interpretation of Burned Human Remains", discuss your thoughts of the "Fatal Fire Scene Processing Protocols" that begin on page 62 and end on page 80.</p> <p>2. Provide a substantive response to a fellow student colleague. Don't just agree or disagree-- provide a substantive response or in support or non-support.</p>
14	<ul style="list-style-type: none"> <li>Fire Testing - Models - Fire Department Response - Experiments</li> </ul>	<p>1. Assess the various testing methods.</p> <p>2. Analyze the importance of scene processing.</p> <p>3. Determine the need to conduct a final analysis.</p>	<ul style="list-style-type: none"> <li>Forensic Fire Scene Reconstruction - p351 through p387</li> </ul>	1. Post your thoughts on the class. What recommendations would you make to improve the content and delivery?

15	<ul style="list-style-type: none"> <li>Final Paper Due</li> </ul>	1. Synergize the topics of the previous 14 weeks and demonstrate an understanding of the key points.	<ul style="list-style-type: none"> <li>Final Paper</li> </ul>	1. Prepare a one (1) page summary of what you have learned over the last 15 weeks. Be sure to address whether this course will assist you in either becoming a fire investigator or will enhance your duties of a fire investigator.
----	-------------------------------------------------------------------	------------------------------------------------------------------------------------------------------	---------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

## GRADING POLICIES:

*The grade is based on a point system. You divide the total number of earned points into the total amount of points available to determine your grade. A grading rubric for the final project is under the Resource Tab on the course.*

Assignment	Points or percentage
Grading Discussion Participation – 50 points each discussion	550 points
Three Assignment Papers – 200 points each assignment	600 points
Final Paper - comprehensive and applied	50 points
<b>Total Grade</b>	<b>1200 points</b>

## GRADING SCALE

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

A = 93.0 to 100%	C = 73.0 to 76.9
A- = 90.0 to 92.9	C- = 70.0 to 72.9
B+ = 87.0 to 89.9	D+ = 67.0 to 69.9
B = 83.0 to 86.9	D = 63.0 to 66.9
B- = 80.0 to 82.9	D- = 60.0 to 62.9
C+ = 77.0 to 79.9	F = below 60

## EVALUATION PROCESS:

Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three Weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu>.

Reynolds (2017)