

CIS 5207- Advanced AI/ML Techniques for Digital Forensic Applications Next Generation Forensics – Fall 2023

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Course Assignments: Post to Canvas

Tu/Th Schedule – 12:30PM – 1:45PM

Room: PG6 144

References:

1. Digital Forensics – Edited by Andre Arnes – Wiley**
2. Cybercrime, Digital Forensics and Jurisdiction – Springer
3. Big Data Forensics – Learning Hadoop Investigations - by Joe Sremack – Packt publications**
4. Handbook of Digital Forensics and Investigations- Edited by Eoghan Casey – Elsevier
5. Artificial Intelligence A Modern Approach - Stuart J. Russell, Peter Norvig - Pearson **

Tentative Schedule

The weekly coverage might change as it depends on the progress of the class. However, you must keep up with the reading assignments. The dates of Exams are announced in the schedule.

CIS 5207- Advanced AI/ML Techniques for Digital Forensic Applications Next Generation Forensics – Fall 2022						
Module	Week	Class Date	Class #	Synopsis	Reading	Lecture
1	1	08/22/2023	1	Course Overview; Introduction to Digital Forensics	(1) 1,2	
1	1	08/24/2023	2	Introduction to Digital Principles, Scientific methods in DF etc.	Sup.1	Discussion Forum 1 posted
	2	08/29/2023	3	Discussion Forum 1		
2	2	08/31/2023	4	Robust Deep Learning based Digital Forensics: Introduction to Deepfakes	5(18) Sup. 2	
2	3	09/05/2023	5	ML/DL used for Deepfake generation Stochastic Neural Network (SNN) for Deepfakes;	Sup. 3	Assignment 1 Posted
2	3	09/07/2023	6	Confidence distribution of SNN and the sensitivity of training data to determine authenticity of	Sup. 4	Discussion Forum 2 posted

				images; Multichannel ensemble model to detect video anomalies		
	4	09/12/2023	7	Discussion Forum 2 / Review session		
	4	09/14/2023	8	Exam 1		
3	5	09/19/2023	9	Introduction to Network Forensics	(4) 9,10	
3	5	09/21/2023	19	Extract Forensic Event Signatures Using Network Science Techniques: Similarity with respect to "Offenders" or "Victims"	(4) 9,10	
3	6	09/26/2023	11	Spatial Cascadability of the Crime Events; Spectral Analysis of the Crime Events; Clusterability with respect to "Time"	(4) 9,10	Assignment 2 Posted
3	6	09/28/2023	12	Spatio-Temporal Assortative Matching of the Crime Events; Homophily among Crime Events of more than one Law Code	(4) 9,10	
3	7	10/03/2023	13	Network Forensic including modeling, duplication, analysis, file carving, network surveillance, network attack traceback and attribution, multimedia forensics etc. Review Session	(4) 9,10	
	7	10/05/2023	14	Exam - 2		
4	8	10/10/2023	15	Big Data Digital Forensics: Retrieving forensic evidence from Log Files & Review Session	(3) 1,2	
	8	10/12/2023	16	LAB		Discussion Forum 3 posted
	9	10/17/2023	17	Discussion Forum 3		
4	9	10/19/2023	18	Forensic model using Hadoop Distributed File System (HDFS)	(3) 3,4,5,6	Assignment 3 Posted
4	10	10/24/2023	19	Design Forensics-as-a-Service (FaaS) for Digital Forensic investigators;	Sup. 5	
4	10	10/26/2023	20	GPU-based Architecture for Latent Fingerprints	Sup. 6	Discussion Forum 4 posted
	11	10/31/2023	21	Discussion Forum 4		
5	11	11/02/2023	22	Drone Forensics with Machine Learning based Fingerprinting and Blockchain Introduction; Video Source Proofing	Sup 7	
5	12	11/07/2023	23	Noise pattern extraction and comparison	Sup 8	Assignment 4 Posted
5	12	11/09/2023	24	DL and Neural Network based identification of image/video authenticity	Sup 9	Discussion Forum 5 posted

5	13	11/14/2023	25	Interoperability across image sources	Sup 10	
	13	11/16/2023	26	Discussion Forum 5		
	14	11/28/2023	27	Project Presentations		
		11/30/2023	28	Project Presentations & Review Session		
				FINAL EXAM		(Dates: TBD)
		12/13/2023		Grade Reports by Faculty Deadline		
		12/14/2023		Grades Posted		

Grading Policy :

Item	Score (%)
4 Assignments	16% (4% each)
Project	25%
Lab Work	10%
Pre-Exam 1	12%
Pre-Exam 2	12%
Final Exam	20%
5 Discussion Forums	5%
Total	100%

Written Report		Oral Presentation	
Number Required	Approx. Number of pages	Number Required	Approx. Time for each
1	10	1	10 Minutes

Letter Grade Distribution:

Letter	Range (%)	Letter	Range (%)	Letter	Range (%)
A	95 - 100	B	80 - 84	C	65 - 73
A-	88 - 94	B-	77 - 79	D	57- 64 (Fail)
B+	85 - 89	C+	74 - 76	F	0 - 56 (Fail)

Exam policy:

- **This course requires 3 (three) exams: 2 midterms and a final (not cumulative) exam.**
- All exams are required and there are no make-up tests. You must take these in-term exams on the dates listed on this document.
- The exam duration is **75 minutes**.

Assignment policy:

- This course includes 4 (Four) assignments.
- The assignments must be completed individually, however, to solve the assignment's problems, you are allowed to consult other books, or to discuss the problems with other students, but you should cite any such sources that you use. You must write up your solutions on your own. Merely copying answers from other books or other students is not acceptable.
- Assignments will be submitted to the on Canvas.
- Late assignments or assignments submitted by email will be not accepted.
- The expected turnaround time for grades is 10 days.

General:

I reserve the right to change the method of assigning grades, including changing the number of assignments and to curve the grades over the entire grading schedule.

10 Min long project presentation

8 days' time for assignments

5 discussion forums – each at the end of a module

Forums (Research papers) will be posted one week prior to the presentations

Students have to present the Forum (5 min each + 5 min cross-questions) Last 10 min of class for general discussion

Academic Misconduct

Academic misconduct is incompatible with a degree from FIU. KFSCIS expects all of its students to practice complete honesty and transparency in all of their academic endeavors.

From the FIU Student Conduct and Honor Code:

“Undergraduate, Graduate, and Professional Students at FIU are expected to adhere to the highest standards of integrity in every aspect of their lives. Honesty in academic matters is part of this obligation. Academic integrity is the adherence to those special values regarding life and work in an academic community. Code violations may lead to suspension or expulsion from the University if a determination of responsibility has been made. These sanctions will be determined based on severity of incident and prior violations of the Code.”

All FIU policies regarding academic integrity apply to this course. Acts of academic misconduct may involve (but are not limited to) the following:

- Plagiarism in written or coding submissions
- Cheating during quizzes or exams
- Enabling acts of academic dishonesty by sharing work with other students
- Falsification of information
- Having unauthorized possession of quizzes or exams
- Submitting the work of another person
- Submitting work previously used in another course or in a prior semester, without the express permission of the instructor (self-plagiarism)
- Uploading course materials to any commercial websites without the instructor's express permission
- Utilizing outside 3rd-party paid sources, paying another student, or offering to pay another student to produce the work you submit
- Submitting work from a repository, including third party commercial sites offering work for-hire
- Providing your FIU log-on credentials to anyone else to use for any purpose

If, at any time, you are uncertain about permitted or prohibited actions in this course, consult the instructor for guidance.

Zero tolerance for academic misconduct: If you commit any form of academic misconduct in this course, you *WILL* be reported to the FIU Student Conduct and Academic Affairs office.

Failure to adhere to the guidelines stated above may result in one of the following:

- Expulsion: Permanent separation of the student from the University, preventing readmission to the institution. This sanction shall be recorded on the student's transcript.
- Suspension: Temporary separation of the student from the University for a specific period of time.

By taking this course, you promise to adhere to FIU's Student Code of Academic Integrity.

For details on the policy and procedures please visit the following Academic Misconduct links:
<https://online.fiu.edu/student/resources/policies.php>

Short version of the FIU honor code:

https://academic.fiu.edu/AcademicBudget/misconductweb/Code_of_Academic_Integrity.pdf

Complete version as included in the full regulations document – See section 6 (starting on page 14) for academic misconduct: <https://regulations.fiu.edu/docs=257>

**“I would prefer even to fail with honor than win by cheating.”
— Sophocles**