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**School of Science and Technology
Department of Information Technology
ISSC650: Advanced Digital Forensics
3 Credit Hours
8 Week Course
Prerequisite(s): None**

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Instructor Information

Instructor:
Bio:
Email:
Phone:
Office Hours:

> **NOTE: I**T IS **I**MPORTANT THAT THE STUDENT READ THE ENTIRE **S**TUDENT **S**YLLABUS THOROUGHLY. **T**HIS DOCUMENT DETAILS MY GOALS AND EXPECTATIONS FOR THIS COURSE AND PROVIDES ALL OF THE NECESSARY INFORMATION CONCERNING ASSIGNMENTS, GRADING AND ADDITIONAL COURSE REQUIREMENTS.

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Course Description

This course is an advanced study of the models of investigative methods for finding evidence in a wide scope of disparate digital devices such as computers, networks, mobile phones, PDAs, MP3 players, and any device or appliance that carries an electronic circuit board which could potentially store data or information. It also examines the science, the evidence, and the law related to digital forensics, the validation of findings, and determination of acceptable and irrefutable evidence in a court of law. It also

evaluates various digital forensics models for data identification, preservation, collection, examination, analysis, preparation, and presentation.

Course Scope

This course will guide the student through the various steps of basic cyber forensic investigations, with the objective of preparing the student to participate with trained cyber forensic professionals, and to forensically evaluate a suspect machine. This will be done by evaluating established standard operating procedures for a cyber forensic laboratory, cyber forensic investigation techniques and current data security and integrity exposure. As you progress through the course, you will be presented with information that will provide a platform for establishing a stronger understanding of the forensic process and its relationship to and dependency on technology, and its codependency on the legal and legislative process. This course will examine the rules of evidence and chain of custody in maintaining electronic evidence; how to begin an investigation, the investigative methodology to employ as well as an examination of the steps in a cyber forensics investigation. Some of the key areas that will be covered in detail are the forensic process; how to take control of a suspect computer and its "operating" environment, along with potential exposures.

Course Objectives

After completing this class, you will be able to:

1. Examine and expound upon concealment techniques, emerging technologies, and relevant legislations related to digital forensics

2. Analyze the scope, legal issues, ethical challenges, and societal impact of digital forensics to reveal and track legal and illegal activity

3. Assess the principles, practices, procedures, and methodologies for conducting digital forensics investigations in the field and laboratory
4. Investigate and apply rules of evidence and chain of custody

5. Evaluate current data security and data integrity exposure of devices from a multi-functional device perspective

6. Synthesize a plan for the seizure of electronic evidence in operating environments within computers, PDAs, automobiles, and other electronic devices

Course Delivery Method

This M.S. in Information Technology course delivered via distance learning will enable students to complete academic work in a flexible manner, completely online. Course materials and access to an online learning management system will be made available to each student. **Online assignments are due by the last day of each week** and include Forum questions (accomplished in groups through a threaded Forum) and individual assignments (submitted for review by the Faculty Member). Assigned faculty will support the students throughout this eight-week course.

Course Materials

Required Text
Casey, Eoghan, (2009) Handbook of Digital Forensics and Investigation. Academic Press
ISBN: 0123742676/978-0123742674

Reference: Blackley, J. A., Peltier, J., & Peltier, T. (2003) *Information Security Fundamentals, 1*st *Edition.* Boca Raton, FL. Auerbach Publications. ISBN: 0849319579/9780849319570

Reference: American Psychological Association. (2010). *Publication manual of the American Psychological Association* (6th edition). Washington, DC: Author. ISBN: 1-4338-0561-8

Software Requirements
1. Microsoft Office (MS Word, MS Excel, MS PowerPoint)
2. Adobe Acrobat Reader
3. A number of testing tools

Evaluation Procedures

The grading will be based on six graded homework assignments, eight Forum postings, contact points, a final exam and an end of course final research paper.

1.   There will be six homework assignments during the course. The assignments will count as 30% of the final grade. The homework assignments will follow each of the major portions of the course. These assignments will be research problems or questions from the text. They are selected to provide the student with information to understand the concepts discussed. Assignments should be prepared in Microsoft Word or an equivalent word processor program and uploaded into the student folder by the due date.

2.   There will be eight Forum postings you will need to respond to. The Forum postings will count as 40% of the final grade. Answers should be a paragraph with a **topic sentence** that **restates the question** and **supporting sentences** using the terms, concepts, and theories from the required readings. Each initial post should be a **minimum of 500 words**. In the response to each student, you may **attack**, **support** or **supplement** other students' answers using the terms, concepts and theories from the required readings. All responses should be a **courteous paragraph** that contains a **topic sentence** with good **supporting sentences** and should be a **minimum of 200 words**. You may respond multiple times with a continuous discussion with points and counter points. The key requirement is to express your idea and then **support your position** using the terms, concepts and theories from the required readings to demonstrate to me that you understand the material. The Forums will count as 40% of the final grade.

3.   The final research paper will be a culmination of knowledge garnered from the writing assignments from weeks 1 through 7. The final paper in its entirety will count as 30% of your final grade. The 30% will include an outline (1%), rough draft (4%), paper (20%) and a peer review (5%).

>   *1.* See

Selected Bibliography

Web Resources for Advanced Digital Forensics

1) **Digital Forensics Association**
   http://www.digitalforensicsassociation.org/library/

2) *NIJ: Forensic examination of digital evidence guide*
   http://www.ncjrs.gov/pdffiles1/nij/199408.pdf

3) *Computer Forensic tool testing*
   http://www.ojp.usdoj.gov/nij/topics/technology/electronic-crime/cftt.htm

4) *Recovering and Examining Computer Forensic Evidence*
   http://www.fbi.gov/hq/lab/fsc/backissu/oct2000/computer.htm

5) **Computer Forensic white papers**
   http://www.forensics.nl/links

6) *Forensic Focus*
   http://www.forensicfocus.com/

Appendix A – Grading Rubric for Grading Criteria on assignments listed above.

ASSIGNMENT REQUIREMENTS:

This course has a strong writing component. The goal is to organize, synthesize, and demonstrate your comprehension of core concepts investigated during this course by applying a combination of the terms, concepts, and details you have learned in a systematic way. As important as "the details" that you analyze and arrange in your writing, however, are the conclusions you draw from those details, and your predictions, responses to, and ultimate interpretation of those details. At this level you are expected to be writing and synthesizing your knowledge and properly using resources and citations. All assignments are to include a minimum of 3 citations, an abstract, and a proper conclusion. The length can vary but the content itself should be about 3 pages. This includes the conclusion but not the cover page, reference page or the abstract.

FORUM POSTINGS:

Each week a Forum question will be provided for a discussion of the week's readings. A specific assignment for posting on the Forum will be announced each week. The assignments may involve discussion or debate. The number of postings required each week will vary and will be announced in the assignment for the week. In most cases, you will be required to post at least one original post and one or more follow-ups to your classmates' posts.

Your first post each week must be posted by Wednesday at midnight EST. Please try not to be late with this post because your classmates will be relying on you to post on time to give them a post to respond to later in the week. All follow-up posts must be posted by Sunday at midnight EST.

RESEARCH PAPER:

You will be required to write a final research paper this semester. The specifications are as follows:
1. 10 pages (double-spaced) Arial 10 pt font.
2. Choose any topic related to the course and write about the latest developments and issues. This should be an accrual of the concepts you learned throughout the course.
3. Use at least ten references outside of your textbook (you may use your textbook too, but are not required to).
4. In addition to the required number of pages for the assignment, you must also Include a reference page (bibliography), written in **APA style** and a title page. Be sure to give all of your papers a descriptive title.
5. A rough draft of the paper at the end of Week 6. This is to be a **complete** paper, meeting the page requirements – not a partially completed paper. Points will be deducted for short or incomplete papers. Your rough draft will be graded and helpful feedback will be provided to indicate where you are falling short. You may correct any deficiencies before resubmitting your final draft at the middle of Week 8.
6. Typewritten in double-spaced format with a readable style and font and submitted inside the electronic classroom (unless classroom access is not possible and other arrangements have been approved by the professor).
7. Page margins Top, Bottom, Left Side and Right Side = 1 inch, with reasonable accommodation being made for special situations
8. Your paper must be in your own words, representing original work. Paraphrases of others' work must include attributions to the authors. **Limit quotations to an average of no more than 3-5 lines, and use quotations sparingly!** It is always better to paraphrase than to directly quote.

All assignments and Forum questions are required by 12:00 midnight Eastern Time on the posted due date in order to receive maximum credit.

Grade Instruments	Points Possible	Approx. % of Final Grade
6 Assignments - 5 points each	**30**	**30%**
8 Forum Discussions - 5 points each	**40**	**40%**
Final Paper **Outline – 1 point** **Rough draft - 4 points** **Final submission -20 points** **One peer review – 5 points**	**30**	**30%**
TOTAL	**100 Points**	**100%**

Course Outline

Course Overview

Course Deadlines/Milestones
- **Participation in discussions is required for Week 1 through Week 8**
- **End of Fourth Week: Assignments 1-4 submitted, final paper outline due**

- **End of Sixth Week: Assignments 1-6 submitted, final paper rough draft due**

- **Mid-week Eight Week: Final paper due**

Week	Topic(s)	Course/Learning Objectives	Assignment(s)
1	*Investigative Methodology Introduction Forensic Analysis*	**CO1** **Learning Objective(s):** Successful students will be able to describe and explain: Technology and Law The Investigative Process Investigative Reconstruction Motive & Technology	Read chapters 1 & 2 Week 1 Forum Introduction 1. Post a brief introduction to the class. Address the following in your post: Name, where you live (City and/or State), job, educational goals, time zone, and forensic, law or e-discovery experience, why you chose to take this course, and other pertinent information you wish to share. 2. Verify that you have downloaded the syllabus and have read it. Post any questions you have. 3. Discuss investigative processes for salvaging deleted data. 4. Respond to at least 2 students. 5. Summarize your weekly DB interaction. Individual Assignment: Analyze the problem and hypothesis potential solutions. In 2-3 pages, provide a summary of the problem, possible solutions and analysis conducted in an APA format style document on how forensic

			science methods are applied to digital forensics. Post the assignment to the Assignment 1 area.
2	*Electronic Discovery Intrusion Investigation*	**CO1, CO2** **Learning Objective(s):** Successful students will be able to describe and explain: Incident Management Estimating Cost of an Incident Evidence Assessment Types of Incidents and Level of Support	Read chapters 3 & 4 Week 2 Forum Discuss the importance of Zubalake v UBS Warburg to e-discovery Respond to at least 2 students. Summarize your weekly DB interaction. Individual Assignment: Analyze the problem and hypothesis potential solutions. In 2-3 pages, provide a summary of the problem, possible solutions and analysis conducted in an APA format style document on intrusion investigation processes. Post the assignment to the Assignment 2 area and for peer review. Review the assignment of at least other student.
3	*Technology Windows Forensic Analysis*	**CO3, CO4** **Learning Objective(s):** Successful students will be able to describe and explain: Overview of Tools Dealing with Password Protection and Encryption Log Files File System Traces Registry Internet Traces Web Browsing	Read chapters 5 Week 3 Forum Discuss file attributes associated with NTFS and how they relate to metadata. Respond to at least 2 students. Summarize your weekly DB interaction. Individual Assignment: Analyze the problem and hypothesis potential solutions. In 2-3 pages, provide a summary of the problem, possible solutions and analysis conducted in an APA format style document provide a summary of the problem, possible solutions and analysis conducted in an APA format style document on conducting Windows forensic investigations. Post the assignment to the Assignment 3 area.
4	*UNIX Forensic Analysis Macintosh Forensic Analysis*	**CO3, CO4** **Learning Objective(s):** Successful students will be able to describe and explain: Overview of Tools File Systems Dealing with Password Protection and Encryption Log Files File System Traces Registry Internet Traces Web Browsing	Read chapter 6 & 7 Week 4 Forum Discuss UNIX and Mac data-time stamp analysis and how they relate to NTFS date-time stamp analysis. Respond to at least 2 students. Summarize your weekly DB interaction. Individual Assignment: Analyze the problem and hypothesis potential solutions. In 2-3 pages, provide a summary of the problem, possible solutions and analysis conducted in an APA format style document on how to conduct UNIX or Macintosh forensic investigations. Post the assignment to the Assignment 4 area and for peer review. Review the assignment of at least other student. Final paper outline due

5	*Embedded Systems Analysis*	**CO3, CO4** **Learning Objective(s):** Successful students will be able to describe and explain: Overview of Handheld Devices Memory Data Storage and Manipulation Collection and Examination of Handheld Devices Handheld Operating Systems PDAs Mobile Telephones	Read chapter 8 Week 5 Forum Discuss the difference between CDMA and GSM technology and how they affect handheld acquisitions Respond to at least 2 students Summarize your weekly DB interaction. Individual Assignment: Analyze the problem and hypothesis potential solutions. In 2-3 pages, provide a summary of the problem, possible solutions and analysis conducted in an APA format style document on how handheld device investigations differ from computer investigations. Post the assignment to the Assignment 5 area
6	*Network Investigations*	**CO5, CO6** **Learning Objective(s):** Successful students will be able to describe and explain: Documentation, Collection, and Preservation Filtering and Data Reduction Class/Individual Characteristics and Evaluation of Source Evidence Recovery Investigative Reconstruction Behavioral Evidence Analysis Reporting Results	Read chapter 9 Week 6 Forum Discuss collecting and interpreting network data. Respond to at least 2 students. Summarize your weekly DB interaction. Final paper rough draft
7	*Mobile Network Investigations*	**CO5, CO6** **Learning Objective(s):** Successful students will be able to describe and explain: Mobile Technologies Timelines and Methods Legal Concerns Data Interpretation	Read chapter 10 Week 7 Forum Discuss how mobile network investigations differ from computer network investigations. Respond to at least 2 students Summarize your weekly DB interaction. Post final paper peer review. Review the paper of at least one student. Provide meaningful feedback.
8	*The Future of Forensics*	**CO1, CO2** **Learning Objective(s):** Successful students will be able to describe and explain: Future Forensic Technologies Future Legal Concerns	Week 8 Forum Discuss what you have learned this semester including legal issues, ethical challenges, emerging technologies, and relevant legislations related to digital forensics. Respond to at least 2 students. Summarize your weekly DB interaction. Individual Assignment: Analyze the problem and hypothesis potential solutions. In 2-3 pages, provide a summary of the problem, possible solutions and analysis conducted in an APA format style document on what you liked

			about the course, what you did not like, what you found challenging and what you would change. Post the assignment to the Assignment 6 area. Final Paper due

Course Outline by Week by Week

Week 1 Topic: Introduction to Forensic Analysis
In this portion of the course you will learn about forensic analysis.

Add Course Objectives:

Learning Objective(s): Successful students will be able to describe and explain:
Technology and Law
The Investigative Process
 Investigative Reconstruction
Motive & Technology

Required Reading(s): Chapters 1 and 2 of the textbook – pages 1 through 62

Assignment(s):
a) Answer online Week 1 Forum Question
1. Post a brief introduction to the class. Address the following in your post:
Name, where you live (City and/or State), job, educational goals, time zone, and forensic, law or e-discovery experience, why you chose to take this course, and other pertinent information you wish to share.
2. Verify that you have downloaded the syllabus and have read it. Post any questions you have.
3. Discuss investigative processes for salvaging deleted data.
4. Respond to at least 2 students.
5. Summarize your weekly DB interaction.

b) Complete Assignment 1
Analyze the problem and hypothesis potential solutions. In 2-3 pages, provide a summary of the problem, possible solutions and analysis conducted in an APA format style document on how forensic science methods are applied to digital forensics. Post the assignment to the Assignment 1 area.

Week 2 Topic: Electronic Discovery and Intrusion Investigation
In this portion of the course you will learn about electronic discovery and intrusion investigation.

Learning Objective(s): Successful students will be able to describe and explain:
    Incident Management
    Estimating Cost of an Incident
    Evidence Assessment
     Types of Incidents and Level of Support

Required Reading(s): Chapters 3 and 4 of the textbook – pages 64 through 208.

Assignment(s):
a) Answer online Week 2 Forum Question
1. Discuss the importance of Zubalake v UBS Warburg to e-discovery
2. Respond to at least 2 students.
3. Summarize your weekly DB interaction.

b) Complete Assignment 2

Analyze the problem and hypothesis potential solutions. In 2-3 pages, provide a summary of the problem, possible solutions and analysis conducted in an APA format style document on intrusion investigation processes. Post the assignment to the Assignment 2 area and for peer review.
Review the assignment of at least other student.

Week 3 Topic: Windows Forensic Analysis
In this portion of the course you will learn about Windows forensic analysis.

Learning Objective(s): Successful students will be able to describe and explain:
Overview of Tools
Dealing with Password Protection and Encryption
Log Files
File System Traces
Registry
Internet Traces
Web Browsing

Required Reading(s): Chapter 5 of the textbook – pages 209 through 300.

Assignment(s):
a) Answer online Week 3 Forum Question
1. Discuss file attributes associated with NTFS and how they relate to metadata.
2. Respond to at least 2 students.
3. Summarize your weekly DB interaction.

b) Complete Assignment 3
Analyze the problem and hypothesis potential solutions. In 2-3 pages, provide a summary of the problem, possible solutions and analysis conducted in an APA format style document provide a summary of the problem, possible solutions and analysis conducted in an APA format style document on conducting Windows forensic investigations. Post the assignment to the Assignment 3 area.

Week 4 Topic: UNIX and Macintosh Forensic Analysis
In this portion of the course you will learn UNIX and Macintosh forensic analysis*.*

Learning Objective(s): Successful students will be able to describe and explain:
Overview of Tools
File Systems
Dealing with Password Protection and Encryption
Log Files
File System Traces
Registry
Internet Traces
Web Browsing

Required Reading(s): Chapters 6 and 7 of the textbook – pages 301 through 382.

Assignment(s):
a) Answer online Week 4 Forum Question
1. Discuss Unix and Macintosh based recovery tools.
2. Respond to at least 2 students.
3. Summarize your weekly DB interaction.

b) Complete Assignment 4
Analyze the problem and hypothesis potential solutions. In 2-3 pages, provide a summary of the problem, possible solutions and analysis conducted in an APA format style document provide a summary of the problem, possible solutions and analysis conducted in an APA format style document on UNIX or Macintosh forensic investigations. Post the assignment to the Assignment 4 area and for peer review. Review the assignment of at least other student.

c) Final Paper Outline Due
Week 5 Topic: Embedded System Analysis
In this portion of the course you will learn embedded system analysis.

Learning Objective(s): Successful students will be able to describe and explain:
 Overview of Handheld Devices
Memory
Data Storage and Manipulation
Collection and Examination of Handheld Devices
Handheld Operating Systems
PDAs
Mobile Telephones
Required Reading(s): Chapter 8 of the textbook – pages 383 through 436

Assignment(s):
a) Answer online Week 5 Forum Question
1. Discuss the difference between CDMA and GSM technology and how they affect handheld acquisitions.
2. Respond to at least 2 students.
3. Summarize your weekly DB interaction.

b) Complete Assignment 5
Analyze the problem and hypothesis potential solutions. In 2-3 pages, provide a summary of the problem, possible solutions and analysis conducted in an APA format style document on how handheld device investigations differ from computer investigations. Post the assignment to the Assignment 5 area.

Week 6 Topic: Network Investigations
In this portion of the course you will learn about network investigative techniques.

Learning Objective(s): Successful students will be able to describe and explain:
Documentation, Collection, and Preservation
Filtering and Data Reduction
Class/Individual Characteristics and Evaluation of Source
Evidence Recovery
Investigative Reconstruction
Behavioral Evidence Analysis
Reporting Results

Required Reading(s): Chapter 9 of the textbook – pages 437 through 516.

Assignment(s):
a) Answer online Week 6 Forum Question
1. Discuss collecting and interpreting network data.
2. Respond to at least 2 students.
3. Summarize your weekly DB interaction.

b) Final Paper Rough Draft Due

Week 7 Topics: Mobile Network Investigations
In this portion of the course you will learn about mobile network investigative techniques.
Learning Objective(s): Successful students will be able to describe and explain:
     Mobile Technologies
     Timelines and Methods

Legal Concerns
Data Interpretation

Required Reading(s): Chapter 10 of the textbook – pages 517 through 558.
Assignment(s):
a) Answer online Week 7 Forum Question
1. Discuss how mobile network investigations differ from computer network investigations.
2. Respond to at least 2 students.
3. Summarize your weekly DB interaction.

b) Final Paper Peer Review
Post final paper for peer review.
Review the paper of at least one student. Provide meaningful feedback.

Week 8 Topics: Course Review
In this portion of the course you will review the techniques learned throughout the course.
Learning Objective(s): Successful students will be able to describe and explain:
Future Technologies
Future Legal Concerns

Assignment(s):
a) Answer online Week 8 Forum Question
Week 8 Forum
1. Discuss what you have learned this semester including legal issues, ethical challenges, emerging technologies, and relevant legislations related to digital forensics.
2. Respond to at least 2 students.
3. Summarize your weekly DB interaction.

b) Complete Assignment 6
Individual Assignment:
Analyze the problem and hypothesis potential solutions. In 2-3 pages, provide a summary of the problem, possible solutions and analysis conducted in an APA format style document on what you liked about the course, what you did not like, what you found challenging and what you would change. Post the assignment to the Assignment 6 area.

c) Final Paper
Submit your final research paper by the assigned due date.

RESEARCH PAPER:
You will be required to write a final research paper this semester. The specifications are as follows:
1. 10 pages (double-spaced) Arial 10 pt font.
2. Choose any topic related to the course and write about the latest developments and issues. This should be an accrual of the concepts you learned throughout the course.
3. Use at least ten references outside of your textbook (you may use your textbook too, but are not required to).
4. In addition to the required number of pages for the assignment, you must also Include a reference page (bibliography), written in **APA style** and a title page. Be sure to give all of your papers a descriptive title.
5. A rough draft of the paper at the end of Week 6. This is to be a **complete** paper, meeting the page requirements – not a partially completed paper. Points will be deducted for short or incomplete papers. Your rough draft will not be graded by the final paper rubric, but helpful

feedback will be provided to indicate where you are falling short. You may correct any deficiencies before resubmitting your final draft at the middle of Week 8.

6. Typewritten in double-spaced format with a readable style and font and submitted inside the electronic classroom (unless classroom access is not possible and other arrangements have been approved by the professor).

7. Page margins Top, Bottom, Left Side and Right Side = 1 inch, with reasonable accommodation being made for special situations

8. Your paper must be in your own words, representing original work. Paraphrases of others' work must include attributions to the authors. **Limit quotations to an average of no more than 3-5 lines, and use quotations sparingly!** It is always better to paraphrase than to directly quote.

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Grading Scale

Please see the student handbook to reference the University's grading scale.

Policies Table of Contents

Please see the student handbook to reference all University policies. Quick links to frequently question asked about policies are listed below.

> Drop/Withdrawal Policy
> Plagiarism Policy
> Extension Process and Policy

WRITING EXPECTATIONS

All written submissions should be submitted in a font and page set-up that is readable and neat. It is recommended that students try to adhere to a consistent format, which is described below.

- Typewritten in double-spaced format with a readable style and font and submitted inside the electronic classroom (unless classroom access is not possible and other arrangements have been approved by the professor).
- Arial 11 or 12-point font or Times New Roman styles.
- Page margins Top, Bottom, Left Side and Right Side = 1 inch, with reasonable accommodation being made for special situations and online submission variances.

CITATION AND REFERENCE STYLE

Assignments completed in a narrative essay or composition format must follow APA guidelines. This course will require students to use the citation and reference style established by the American Psychological Association (APA), in which case students should follow the guidelines set forth in *Publication Manual of the American Psychological Association* (6th ed.). (2010). Washington, D.C.: American Psychological Association.

LATE ASSIGNMENTS

Students are expected to submit classroom assignments by the posted due date and to complete the course according to the published class schedule. As adults, students, and working professionals I understand you must manage competing demands on your time. Should you need additional time to complete an assignment please contact me before the due date so we can discuss the situation and determine an acceptable resolution. Routine submission of late assignments is unacceptable and may result in points deducted from your final course grade.

DISCLAIMER STATEMENT

Course content may vary from the outline to meet the needs of this particular group.

Academic Services TOC

ONLINE LIBRARY RESEARCH CENTER & LEARNING RESOURCES

The Online Library Resource Center is available to enrolled students and faculty from inside the electronic campus. This is your starting point for access to online books, subscription periodicals, and Web resources that are designed to support your classes and generally not available through search engines on the open Web. In addition, the Center provides access to special learning resources, which the University has contracted to assist with your studies. Questions can be directed to orc@apus.edu.

- *Charles Town Library and Inter Library Loan:* The University maintains a special library with a limited number of supporting volumes, collection of our professors' publication, and services to search and borrow research books and articles from other libraries.
- *Electronic Books:* You can use the online library to uncover and download over 50,000 titles, which have been scanned and made available in electronic format.
- *Electronic Journals:* The University provides access to over 12,000 journals, which are available in electronic form and only through limited subscription services.
- *Turnitin.com* is a tool to improve student research skills that also detect plagiarism. Turnitin.com provides resources on developing topics and assignments that encourage and guide students in producing papers that are intellectually honest, original in thought, and clear in expression. This tool helps ensure a culture of adherence to the University's standards for intellectual honesty. Turnitin.com also reviews students' papers for matches with Internet materials and with thousands of student papers in its database, and returns an Originality Report to instructors and/or students.
- *Smarthinking:* Students have access to 10 free hours of tutoring service per year through Smarthinking. Tutoring is available in the following subjects: math (basic math through advanced calculus), science (biology, chemistry, and physics), accounting, statistics, economics, Spanish**,** writing, grammar, and more. Additional information is located in the Online Research Center. From the ORC home page, click on either the "Writing Center" or "Tutoring Center" and then click "Smarthinking." All login information is available..
- *Peer-reviewed Sources:* Students are expected to become familiar with the use of peer-review articles/journals. Peer review (also known as refereeing) is the process of subjecting an author's work, research, or ideas to the scrutiny of others who are experts in the same field. Pragmatically, peer review refers to the work done during the screening of submitted manuscripts and funding applications. This process encourages authors to meet the accepted standards of their discipline and prevents the dissemination of irrelevant findings, unwarranted claims, unacceptable interpretations, and personal views. Publications that have not undergone peer review are likely to be regarded with suspicion by scholars and professionals. Some sources of peer reviewed articles are:
    1. ACM digital library: http://portal.acm.org/dl.cfm
    2. Google Scholar : http://scholar.google.com/
    3. IEEE digital library: http://www.computer.org/portal/web/csdl/home

Selected Bibliography

Web Resources for Advanced Digital Forensics

7) *Digital Forensics Association*
   http://www.digitalforensicsassociation.org/library/

8) *NIJ: Forensic examination of digital evidence guide*
   http://www.ncjrs.gov/pdffiles1/nij/199408.pdf

9) *Computer Forensic tool testing*
   http://www.ojp.usdoj.gov/nij/topics/technology/electronic-crime/cftt.htm

10) *Recovering and Examining Computer Forensic Evidence*
   http://www.fbi.gov/hq/lab/fsc/backissu/oct2000/computer.htm

11) Computer Forensic white papers
http://www.forensics.nl/links

12) Forensic Focus
http://www.forensicfocus.com/

Appendix A – Grading Rubric

All written assignments will be assessed according to this rubric. Note that a score of 0 may be assigned in any category where your work does not meet the criteria for the beginning level.

Assignment Rubric Graduate Level 600+	EXEMPLARY LEVEL 4	ACCOMPLISHED LEVEL 3	DEVELOPING LEVEL 2	BEGINNNIG LEVEL 1	TOTAL POINTS
FOCUS/THESIS	Student exhibits a defined and clear understanding of the assignment. Thesis is clearly defined and well constructed to help guide the reader throughout the assignment. Student builds upon the thesis of the assignment with well-documented and exceptional supporting facts, figures, and/or statements.	Establishes a good comprehension of topic and in the building of the thesis. Student demonstrates an effective presentation of thesis, with most support statements helping to support the key focus of assignment.	Student exhibits a basic understanding of the intended assignment, but the thesis is not fully supported throughout the assignment. While thesis helps to guide the development of the assignment, the reader may have some difficulty in seeing linkages between thoughts. While student has included a few supporting facts and statements, this has limited the quality of the assignment.	Exhibits a limited understanding of the assignment. Reader is unable to follow the logic used for the thesis and development of key themes. Introduction of thesis is not clearly evident, and reader must look deeper to discover the focus of the writer. Student's writing is weak in the inclusion of supporting facts or statements.	10
CONTENT/SUBJECT KNOWLEDGE	Student demonstrates proficient command of the subject matter in the assignment. Assignment shows an impressive level of depth of student's ability to relate course content to practical examples and applications. Student provides comprehensive analysis of details, facts, and concepts in a logical sequence.	Student exhibits above average usage of subject matter in assignment. Student provides above average ability in relating course content in examples given. Details and facts presented provide an adequate presentation of student's current level of subject matter	The assignment reveals that the student has a general, fundamental understanding of the course material. Whereas, there are areas of some concerning in the linkages provided between facts and supporting statements. Student generally explains concepts, but only meets	Student tries to explain some concepts, but overlooks critical details. Assignment appears vague or incomplete in various segments. Student presents concepts in isolation, and does not perceive to have a logical sequencing of ideas.	20

Assignment Rubric Graduate Level 600+	EXEMPLARY LEVEL 4	ACCOMPLISHED LEVEL 3	DEVELOPING LEVEL 2	BEGINNNIG LEVEL 1	TOTAL POINTS
		knowledge.	the minimum requirements in this area.		
CRITICAL THINKING SKILLS	Student demonstrates a higher-level of critical thinking necessary for 300-400 level work. Learner provides a strategic approach in presenting examples of problem solving or critical thinking, while drawing logical conclusions which are not immediately obvious. Student provides well-supported ideas and reflection with a variety of current and/or world views in the assignment. Student presents a genuine intellectual development of ideas throughout assignment.	Student exhibits a good command of critical thinking skills in the presentation of material and supporting statements. Assignment demonstrates the student's above average use of relating concepts by using a variety of factors. Overall, student provides adequate conclusions, with 2 or fewer errors.	Student takes a common, conventional approach in guiding the reader through various linkages and connections presented in assignment. However, student presents a limited perspective on key concepts throughout assignment. Student appears to have problems applying information in a problem-solving manner.	Student demonstrates beginning understanding of key concepts, but overlooks critical details. Learner is unable to apply information in a problem-solving fashion. Student presents confusing statements and facts in assignment. No evidence or little semblance of critical thinking skills.	20
ORGANIZATION OF IDEAS/FORMAT	Student thoroughly understands and excels in explaining all major points. An original, unique, and/or imaginative approach to overall ideas, concepts, and findings is presented. Overall format of assignment includes an appropriate introduction (or abstract), well- developed paragraphs, and conclusion. Finished assignment demonstrates student's ability to plan and organize research in a logical sequence. Student uses at least of 5-7 references in assignment.	Student explains the majority of points and concepts in the assignment. Learner demonstrates a good skill level in formatting and organizing material in assignment. Student presents an above average level of preparedness, with a few formatting errors. Assignment contains less than 5 resources.	Learner applies some points and concepts incorrectly. Student uses a variety of formatting styles, with some inconsistencies throughout the paper. Assignment does not have a continuous pattern of logical sequencing. Student uses less than 3 sources or references.	Assignment reveals formatting errors and a lack of organization. Student presents an incomplete attempt to provide linkages or explanation of key terms. The lack of appropriate references or source materials demonstrates the student's need for additional help or training in this area. Student needs to review and revise the assignment.	20

Assignment Rubric Graduate Level 600+	EXEMPLARY LEVEL 4	ACCOMPLISHED LEVEL 3	DEVELOPING LEVEL 2	BEGINNNIG LEVEL 1	TOTAL POINTS
WRITING CONVENTIONS (GRAMMAR & MECHANICS)	Student demonstrates an excellent command of grammar, as well as presents research in a clear and concise writing style. Presents a thorough, extensive understanding of word usage. Student excels in the selection and development of a well-planned research assignment. Assignment is error-free and reflects student's ability to prepare a high-quality academic assignment.	Student provides an effective display of good writing and grammar. Assignment reflects student's ability to select appropriate word usage and present an above average presentation of a given topic or issue. Assignment appears to be well written with no more than 3-5 errors. Student provides a final written product that covers the above-minimal requirements.	Assignment reflects basic writing and grammar, but more than 5 errors. Key terms and concepts are somewhat vague and not completely explained by student. Student uses a basic vocabulary in assignment. Student's writing ability is average, but demonstrates a basic understanding of the subject matter.	Topics, concepts, and ideas are not coherently discussed or expressed in assignments. Student's writing style is weak and needs improvement, along with numerous proofreading errors. Assignment lacks clarity, consistency, and correctness. Student needs to review and revise assignment.	20
USE OF COMPUTER TECHNOLOGY/ APPLICATIONS	Student provides a high-caliber, formatted assignment. Learner exhibits excellent use of computer technology in the development of assignment. Quality and appropriateness of stated references demonstrate the student's ability to use technology to conduct applicable research. Given assignment includes appropriate word processing, spreadsheet and/or other computer applications as part of the final product.	Assignment presents an above-average use of formatting skills, with less than 3 errors. Students has a good command of computer applications to format information and/or figures in an appropriate format. Student uses at least two types of computer applications to produce a quality assignment.	Student demonstrates a basic knowledge of computer applications. Appearance of final assignment demonstrates the student's limited ability to format and present data. Resources used in assignment are limited. Student may need to obtain further help in the use of computer applications and Internet research.	Student needs to develop better formatting skills. The student may need to take additional training or obtain help from the Educator Help Desk while preparing an assignment. Research and resources presented in the assignment are limited. Student needs to expand research scope. The number of formatting errors is not acceptable.	10
TOTAL POINTS					100