CRITICAL THINKING AND ANALYTIC METHODOLOGIES

PAUF 698R

Instructor: Daniel S. Gressang
Phones: 301-910-3146 cell
E-mail: Gressang@aol.com

COURSE OVERVIEW:

This is a course in critical thinking and analytic methodologies. The ability to think critically, analyze effectively, and solve difficult problems are crucial skills in the intelligence arena. Additionally, rapid changes in technology, information sourcing, and information availability, coupled with fundamental changes in the Intelligence Community and its customers’ expectations have had a significant impact on the intelligence process and the way in which analysis is conducted and disseminated.

COURSE OBJECTIVES:

The principal objective of this course is the fostering of better-equipped, more capable analysts capable of recognizing and address a myriad of challenges in the analytic process. As such, students will be encouraged and expected to think seriously and creatively about: the nature and scope of both critical thinking and analysis; the context in which analysis takes place; the strengths and weakness of various analytic techniques and methodologies; the impact of the technological revolution and recent world events on intelligence analysis; the art and the science of analysis, and; the future needs of analysis in an intelligence context.

This course is a research-and experientially oriented course. As such, students will work individually and in teams exploring assigned aspects of analysis or analytic problems, leading to two project papers and presentations.

COURSE REQUIREMENTS:

Students will be assigned final course grades based on their performance on an individual project, a team project, and class participation. The specific allocation of grade weights is:

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<tr>
<th>Requirement</th>
<th>Percentage of Course Grade</th>
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<tr>
<td>Individual project</td>
<td>30 %</td>
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<tr>
<td>Individual project presentation</td>
<td>20%</td>
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<tr>
<td>Short Assessment / Presentations (20% each)</td>
<td>40%</td>
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<tr>
<td>Participation</td>
<td>10%</td>
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**INDIVIDUAL PROJECT:** Students will select a larger analytic topic, approved by the instructor, and will prepare both written and oral presentations based on their analytic conclusions. Projects will address the selected topic using no fewer than three different analytic techniques. The individual project deliverables will be both a written paper and an in-class presentation explaining the problem addressed, describing the analytic techniques used, discussing the rationale for selection of each technique used, explaining the shortcomings and limitations resulting from use of each technique, and discussing what actions might make the analytic product better. The length of the written presentation should be long enough to meet stated objectives without being too wordy. Oral presentations should be designed to last between 30 and 45 minutes. The written presentation will constitute 30% of the student's final course grade while the oral presentation will account for 20% of the student's final course grade.

**SHORT ASSESSMENTS:** All students are required to find at least two research articles published in a peer reviewed scholarly journal. Students will read each article and identify what analytic method(s) were used to reach the conclusions the author(s) present. Students will then critique each methodology/analytic strategy, identifying the strengths and weaknesses of each. Students will prepare a short paper (no more than 6 pages) briefly summarizing the methodological strategy of each article (1 page), exploring the strengths and weaknesses of that approach (2 pages each), and offering suggestions on how errors and shortcomings could be mitigated or improved (1 page). Students will also offer a short (approximately 10 minute) presentation based on their analysis. Papers will use at least 11-point font, with one-inch margins, and will have at least 1-1/2 line spacing. Each sort assessment will account for 20% of the student's final course grade.

**CLASS PARTICIPATION:** Adequate before-class preparation on the part of each student is essential for success. During each class period, the instructor may ask randomly selected students to either lead class discussions or to summarize the previous week’s discussion. The impromptu discussion leading role, plus participation in discussions led by others, will determine the student’s class participation grade.

**COURSE MATERIALS:**


MISCELLANEOUS NOTES:

All class discussions and presentations, by the instructor, any guest speakers, or students are strictly non-attribution.

The schedule of classes outlined below is subject to change, depending on the availability and schedules of any guest speakers. If changes are necessary, students will be informed as early as possible.

Food and drink are permitted to the extent allowed by the host facility. Please exercise discretion and show consideration for others. Individuals bringing food and drink are expected to clean up after themselves.

Late submissions, including team presentations, are subject to a minimum 5-point grade reduction per day late. If you know you will miss a class, please let the instructor know before the date missed so mutually acceptable arrangements can be made. Note that the deduction is by calendar day, not business or class day.

All work turned in should be in hardcopy. When hardcopy submission is not feasible, softcopy submission can be arranged.

Paper airplanes are permitted, but rocks, sticks, bricks, and other heavy projectiles are not.

OVERVIEW OF CLASSES:

Class session 1: Administrivia; Introductions; Education and Training; Critical Thinking and Analysis
Class session 2: The Context of Intelligence Analysis
Class session 3: Context continued – The Intelligence Cycle and Target Centric Approach
Class session 4: Causality, Necessity, and Sufficiency
Class session 5: Threats to Validity
Class session 6: Perceptions and Biases
Class session 7: Networks and Network Analysis
Class session 8: Structured Analytic Methods, Part I
Class session 9: Structured Analytic Methods, Part II
Class session 10: Scenarios and Prediction
Class session 11: Visual Analytics
Class session 12: Alternative Methods of Analysis
Class session 13: Into the Future -- Technology, Open Source, and Collaboration
Class session 14: Individual Project Presentations
Class session 15: Individual Project Presentations, continued
COURSE OUTLINE:

1. INTRODUCTION

   A. Administrivia
   B. Course Overview
   C. Discussion: What is critical thinking? What is analysis? Are they different, and if so, how? What problems face analysts?

READINGS AND ASSIGNMENT FOR WEEK 2:

1. Explore Internet sites dedicated to critical thinking and analysis. Begin to form some judgments on which site(s) offer the insights into critical thinking and analysis.
2. Read Heuer and Pherson, Chapters 1 and 2
   Carr, Prologue and Chapter 1
   Clark, Part 1 (Chapters 1-3)
   George and Bruce, Part 2
   Moore, Commentary, Preface, Chapter 1
3. Identify two potential individual project topics and be prepared to submit and/or discuss each

2. THE CONTEXT FOR CRITICAL THINKING AND INTELLIGENCE ANALYSIS

   A. Criticisms and recommendations of the Intelligence Community
   B. Differences in customers and customer expectations
   C. Dealing with analytic uncertainty
   D. What is intelligence production?

READINGS AND ASSIGNMENT FOR WEEK 3:

1. Read Carr, Chapter 2
   Clark, Chapters 6 and 8
   George and Bruce, Part 4
   Moore, Chapter 2

3. THE CONTEXT, CONTINUED

   A. The Intelligence Production Cycle: Accurate description of process or
flawed representation?
B. Target-Centric Intelligence Production
C. In-class exercise: Individual problems and the intelligence cycle – planning
the analytic and methodological attack

READINGS AND ASSIGNMENT FOR WEEK 4:

1. Work on projects.
2. Read Carr, Chapters 3 and 4

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4. MAKE IT SO: CAUSALITY, NECESSITY, AND SUFFICIENCY

A. Causality
   1. Simple causality
   2. Complex causality
B. Necessity and Sufficiency
C. Causal Flow Diagramming

READINGS AND ASSIGNMENT FOR WEEK 5:

1. Prepare for First Sort Assessment Presentation
2. Continue work on projects
3. Read Carr, Chapters 5 and 6
   Moore, Chapters 3 and 4

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5. ARE YOU SURE? REALLY SURE? THREATS TO VALIDITY

A. SHORT ASSESSMENT PRESENTATIONS
B. Internal Threats to Validity
C. External Threats to Validity
D. Addressing and Compensating for Threats to Validity

READINGS AND ASSIGNMENT FOR WEEK 6:

1. Continue work on projects
2. Read Carr, Chapters 7, 8, and 9
6. **PERCEPTIONS, BIASES, AND OTHER WRENCHES IN THE WORKS**

A. Perceptions and their effects on analysis  
B. Biases and their effects on analysis  
C. Mirror imaging  
D. Framing and Prospect Theory

**READINGS AND ASSIGNMENT FOR WEEK 7:**

1. Prepare for Short Assessment Presentation  
2. Continue work on projects  
3. Read Carr, Chapter 10 and Epilogue

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7. **SIX DEGREES OF KEVIN BACON: NETWORKS AND NETWORK ANALYSIS**

A. SHORT ASSESSMENT PRESENTATIONS  
B. Six Degrees -- Are we really all that connected?  
C. The Nature of Networks  
D. Social Network Analysis

**READINGS AND ASSIGNMENT FOR WEEK 8:**

1. Continue work on projects  
2. Read Heuer and Pherson, Chapters 3, 7, and 11

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8. **THE TOYS: STRUCTURED ANALYTIC TECHNIQUES, PART I**

A. Hypotheses and hypothesis generation  
B. Chronologies and Timelines  
C. Problem Restatement  
D. Pro-Cons-Fixes

**READINGS AND ASSIGNMENT FOR WEEK 9:**

1. Continue work on projects  
2. Read Heuer and Pherson, as needed for project work
9. **THE TOYS, PART II**

   A. Causal Flow Diagramming  
   B. Weighted Rankings  
   C. Analysis of Competing Hypotheses  

**READINGS AND ASSIGNMENT FOR WEEK 10:**

1. Continue work on projects.  
2. Read Clark, Chapters 9 and 10  
   George and Bruce, Chapter 17 (Smith)  
   Heuer and Pherson, Chapter 6

10. **GAZING INTO THE CRYSTAL BALL: SCENARIOS AND PREDICTION**

   A. Scenario Development

**READINGS AND ASSIGNMENT FOR WEEK 11**

1. Continue working on projects  
2. Read Heuer and Pherson, Chapter 4

11. **DO YOU SEE WHAT I SEE? VISUAL ANALYTICS**

   A. The limits of numbers  
   B. Novel approaches to massive amounts of data  
   C. Visualization

**READINGS AND ASSIGNMENT FOR WEEK 12**

1. Continue working on project  
2. Read Heuer and Pherson, Chapters 5, 8, and 9
12. THE ART OF ANALYSIS: ALTERNATIVE METHODS

A. Brainstorming
B. Devil's Advocacy
C. Intuition. In analysis? Really?
D. Creative analysis

READINGS AND ASSIGNMENT FOR WEEK 13

1. Continue working on projects; prepare for presentations
2. Read Clark, Chapter 13
   George and Bruce, Part 5
   Heuer and Pherson, Chapters 12 and 13
   Moore, pages 74-94

13. INTO THE FUTURE

A. Impact of Technology
B. Role of open source in intelligence production
C. Are two heads better than one? Collaboration in action.
D. Can analysts be creative?

ASSIGNMENT FOR WEEK 14

1. Prepare for final presentation

14. INDIVIDUAL PROJECT PRESENTATIONS

15. INDIVIDUAL PROJECT PRESENTATIONS