ATHK1001 Analytical Thinking

Unit of Study Code: ATHK1001

Coordinator: Dr Bruce Burns
Office: Room 512 Griffith Taylor Building
Phone: 9351 8286
E-mail: bruce.burns@sydney.edu.au

Other lecturing staff: Associate Professor Alex Holcombe
Office: Room 512 Griffith Taylor Building
Phone: 9351 2883
E-mail: alex.holcombe@sydney.edu.au

Format of Unit: 3 x 1 hour lectures/week x 13 weeks
1 x 1 hour tutorial for 13 weeks

Credit Point Value: 6 Credit Points

Time Commitment: 4 hours face to face per week; 8 hours private study per week
(including up to 1 hour preparation for each tutorial)

Prerequisites: None

Assessment:
Assignment 1 (15% of the total mark) 750 word assignment
Due Date: Friday 15th April – Week 6 (online submission)

Assignment 2 (20% of the total mark), up to 1000 word assignment
Due Date: Friday 13th May – Week 10 (online submission)

Mastery Quizzes 1 through 7 (10% of the total mark): Every two weeks an on-line mastery quiz is due. Each quiz is worth 2% and can be done as often as you like. Your final score is your five best quiz scores. The primary goal of these quizzes is to encourage you to engage continuously with the course material.

Tutorial participation (5% of the total mark)
You must attend 80% or more of your tutorial classes to obtain any part of this 5%, else you will receive 0 for this part of the assessment. NB: IT IS YOUR RESPONSIBILITY TO ATTEND THE TUTORIAL YOU ARE ENROLLED IN TO BE MARKED AS PRESENT.

Final Examination (50% of the total mark):
Multiple choice questions for Data Concepts and Analysis (40%), Logic and Critical Reasoning (30%), and Thinking Tools (30%) sections.

Readings: There is no required textbook. There is a recommended book for the “Data Concepts” section of the course:
Other reading resources may be announced during the semester.

NB: This course is administered by the School of Psychology within the Faculty of Science.
Unit of study general description:
Analytical Thinking is a course covering aspects of reasoning, logic, data handling, research design, interpretation of data analysis, and understanding of relationships between variables. It is comprised of three sections: Data Concepts and Analysis, Logic and Critical Reasoning, and Thinking Tools. The section on data concepts and analysis covers aspects of research design, data collection, literature review and basic forms of hypothesis testing are statistical tests are introduced. The logic and critical reasoning section covers material ranging from valid and invalid forms of argument and errors in reasoning to critiques of arguments presented in case studies. The thinking tools section looks at the errors people make in reasoning, decision making and problem solving and how to avoid these errors. Together, the three course components teach foundational skills necessary for carrying out meaningful academic discussions, arguments, and research studies, which may be applied to any content area of enquiry.

Graduate Attributes and Student Learning Outcomes for Analytic Thinking
Graduate attributes are generic skills that encompass not only technical knowledge but additional qualities that will equip students to be strong contributing members of professional and social communities in their future careers. The overarching graduate attributes identified by the University relate to a graduate’s attitude or stance towards knowledge, towards the world, and towards themselves. These are understood as a combination of five overlapping skills or abilities, the foundations of which are developed as part of specific disciplinary study.

1: Research and Inquiry
Graduates of the University will be able to identify and analyse problems, and be both creative and principled thinkers within their discipline.

Student learning outcomes for Analytical Thinking:
(i) Demonstrate the ability to critique the arguments of others.
(ii) Exercise logic and reasoning in the formation of arguments.
(iii) Understand and evaluate the quality of data based on its sources and the manner in which it was obtained.
(iv) Identify the best way of approaching the exploration of a research question.
(v) Identify errors in thinking and how to avoid them.

2: Information Literacy
Graduates of the University will be able to use information effectively in a range of contexts.

Student learning outcomes for Analytical Thinking:
(i) Demonstrate an understanding of different types of variables and the ways in which they can be used.
(ii) Demonstrate the ability to identify premises of arguments and evaluate these.
(iii) Understand potential sources of bias in information.
(iv) Understand the limitations of a source of information and incorporate this into the way in which that information is used.

3: Personal and Intellectual Autonomy
Graduates of the University will be able to work independently and sustain an attitude of openness and capacity to meet new challenges.

Student learning outcomes for Analytical Thinking:
(i) Demonstrate an active participation in debate and discussion.
(ii) Demonstrate the ability to work independently and as a member of a group of students.
(iii) Show a willingness to engage with and respond to unfamiliar problems.
(iv) Demonstrate the ability to regulate learning independently by using course resources appropriately.
(v) Demonstrate the ability to autonomously direct inquiry for the purpose of answering an empirical question

4: Ethical, Social and Professional Understanding
Graduates of the University will hold personal values and beliefs consistent with their role as responsible members of local, national, international and professional communities.

Student learning outcomes for Analytical Thinking:
(i) Recognise the ethical requirements of academic research and discourse.
(ii) Respect and support the practice of sound data collection and analysis. 
(iii) Respect and uphold the value of diversity in opinions and beliefs. 
(iv) Uphold the value of honesty, transparency, and rigour in all academic pursuits. 

5: Communication Skills
Graduates of the University will use and value communication for negotiating, creating new understanding, interacting with others, and furthering their own learning. 

Student learning outcomes for Analytical Thinking: 
(i) Active participation in tutorials

Evidence of learning

Data Concepts and Analysis
Assessment will take the form of a 750 word assignment, which will focus on research skills. It will be based on skills taught in lectures and tutorials in the first third of the course. 40% of the final examination will further assess knowledge of lecture and tutorial material.

Logic and Critical Reasoning
This section will be assessed via an up to 1000 word assignment requiring students to apply critical reasoning skills and demonstrate mastery of these. 30% of the final examination will further assess knowledge of lecture and tutorial material.

Thinking skills
30% of the final examination will assess knowledge of lecture and tutorial material from this section.

SYLLABUS

Data Concepts and Analysis
Conveying information through data
Introduction to ways of describing data such as descriptive statistics, correlation and distributions. Understanding the assumptions and limitations of such descriptions and how to ask the right questions about data so as to be able to assess its usefulness.

Answering questions with data
How we use data to answer questions. Based on an understanding of probability we build up the conceptual basis of hypothesis testing and statistical inference (including t-tests and basic regression analysis). The emphasis is on understanding the results of such analysis rather than the calculations required. From such a conceptual understanding you should be able to critique the use and misuse of these analyses based on aspects such as their research design or data collection methods.

Logic and Critical Reasoning
Elements of argument
Introduction to the structure of arguments and explanations. The role of meaning and definition in argument.

Non-Deductive Argument
Induction and inductive scepticism. Distinguishing causation from correlation.

Case Studies
Science, non-science and pseudo-science. Fallacies in political debates.

Thinking Tools
Reasoning, decision making and problem solving
Introduction to what research into thinking tells us about errors people make, and thus how we may better reason, make decisions, and solve problems.

Effective learning
Applying what we know about memory and skill acquisition to formulate principles for how people learn most effectively.
**Lecture/Tutorial Timetable**

<table>
<thead>
<tr>
<th>WEEK (begin)</th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Due dates</th>
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<tbody>
<tr>
<td>4 (21/3)</td>
<td>10. Inference 11. Polling 12. Regression</td>
<td>Tutorial 4: Instructions for Assignment 1</td>
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<tr>
<td>(28/3)</td>
<td>NON-TEACHING WEEK</td>
<td></td>
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<tr>
<td>11 (16/5)</td>
<td>31. Heuristics and biases 32. Decision making 1 33. Decision making 2</td>
<td>Tutorial 11: Reasoning</td>
<td>Quiz 6 due 20/5</td>
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<tr>
<td>12 (23/5)</td>
<td>34. Problem solving 1 35. Problem solving 2 36. Creativity</td>
<td>Tutorial 12: Decision making</td>
<td></td>
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<tr>
<td>13 (30/5)</td>
<td>37. Improving thinking and learning 1 38. Improving thinking and learning 2 39. Wrapping up</td>
<td>Tutorial 13: Applications</td>
<td>Quiz 7 due 3/6</td>
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Note that lecture and tutorial titles may be subject to change. In the unlikely event that due dates for any assessment change you will be informed in good time by e-mail, postings on the courses e-learning site, and in lecture.

*Anzac Day Public Holiday is Monday of Week 8. Tutorials are not held on Public Holidays. If you are in one of the affected tutorials please go to another tutorial session during the week. Ask the tutor before the tutorial if you can sit in.

**Disruptions to your Study**

If your assessments are disrupted by illness or misadventure or unavoidable community commitments, apply for Special Consideration online.
If you have (or develop) a continuing issue, register with Disability Services here: [www.sydney.edu.au/disability](http://www.sydney.edu.au/disability)

The Faculty of Science does not permit informal special consideration.
Note that students who apply for and are granted either special arrangements or special consideration for examinations in units offered by the Faculty of Science will be expected to sit any replacement assessments in the two weeks immediately following the end of the formal examination period. Later dates for replacement assessments may be considered where the application is supported by appropriate documentation and provided that adequate resources are available to accommodate any later date.

### ATHK1001 Assessment Summary

<table>
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<tr>
<th>What?</th>
<th>When?</th>
<th>Closing date/ Feedback</th>
<th>% Assessment</th>
<th>Compulsory</th>
</tr>
</thead>
</table>
| Assignment 1               | Online – Friday 15\(^{th}\) April | On-time submissions returned Friday 13\(^{th}\) May  
**NB: this is the last possible date and time for submission of the assignment with or without extensions. On-time submissions returned after Friday 13\(^{th}\) May** | 15\%         | Yes*       |
| Compulsory                 |                                 |                                                                                        |              |            |
| Assignment 2               | Online – Friday 13\(^{th}\) May  | On-time submissions returned Friday 3rd June  
**NB: this is the last possible date and time for submission of the assignment with or without extensions. On-time submissions returned after Friday 3rd June** | 20\%         | Yes*       |
| Compulsory                 |                                 |                                                                                        |              |            |
| Mastery Quizzes 1-7        | Online - Every second week (total of 7 – best 5 will count) | Immediate feedback, unlimited attempts are available up until the final date listed for each quiz on the Lecture/Tutorial Timetable. | 10\% (2\% each, only five best scores count) | No         |
| Tutorial Participation     | Weekly – you must attend your allocated tutorial | Tutorial attendance records will be made available the week following a tutorial via Blackboard. You will be informed by e-mail that the attendance records for the previous week have been posted. You then have two weeks in which to request a correction if there has been a mistake. Final participation marks are released to students at the end of Semester via Blackboard Grade Centre. (You must attend at least 80% of tutorials to obtain any part of this 5%, or else you will receive 0 for this part of the assessment) | 5\%          | No         |
| Exam**                     | During exam period (13\(^{th}\) June – 24\(^{th}\) June) | University Final Results Release Date for Semester 1, 2016 | 50\%         | Yes*       |
| Compulsory                 |                                 |                                                                                        |              |            |

**Total 100\%**

* Completion of compulsory assessments is necessary to pass this unit. Students who fail to complete any of these components will receive an “Absent Fail” grade, regardless of their marks in other assessments. To fulfill this requirement a serious attempt must be made. A non-serious attempt would be one that is excessively short, or does not address the questions asked, or was not wholly written by the student.  
** If a replacement exam is required it may vary in format to the original exam.

All assessments in ATHK1001 must be completed individually (not as groups).
Late penalties

You will receive a penalty of 2% of the maximum value of the Assignments 1 and 2 (e.g. 2 marks / 100) for each calendar day (or part thereof) it is late, up to the closing date of the assignment, after which no more submissions of the original assignment will be accepted.

Assuring the Academic Integrity of ATHK1001

All written assignments will be submitted to Turnitin similarity detecting software in this unit. If we suspect your assignment has been written by someone else, we reserve the right to ask you to explain and defend the work you have submitted as your own, in person.

If you are a commencing student at the University of Sydney you are required to complete the Academic Honesty Education Module. Please do this before you submit any written work to any unit of study.

All Special Consideration requests are now processed centrally and Professional Practitioners certificates will be cross checked with medical service providers. Keep a hard copy of all documentation you submit until you graduate.

Data collection

Note that your participation in this unit of study permits us to use your learning analytics to improve your experience of learning.

eLearning/Blackboard access

You are required to be given access to the eLearning site for this Unit of Study from the beginning of the week before semester begins. This document, and in particular details about assessment due dates, weightings and closing dates, must be available on that eLearning site from that time, and changes will not be made to these details throughout semester except in exceptional circumstances. The elearning portal is: elearning.sydney.edu.au