COURSE SYLLABUS

Philosophy 203: Scientific Reasoning

SECTION 01 MWF 8:00-8:50

HUMANITIES DIVISION
LANDER UNIVERSITY
GREENWOOD, SC 29649

Lee C. Archie

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1 Essential Information

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<tr>
<td>Office: LC M33</td>
<td>MWF 9:00-10:00; 11:00-12:00</td>
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<tr>
<td>Telephone: 864-388-8383</td>
<td>TTh 9:30-11:00</td>
</tr>
<tr>
<td>Email: <a href="mailto:larchie@philosophy.lander.edu">larchie@philosophy.lander.edu</a></td>
<td>ICQ: 14365150</td>
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1.1 Supplementary Materials

Philosophy Homepage: http://philosophy.lander.edu/
Scientific Reasoning Homepage: http://philosophy.lander.edu/scientificreas/
srhelp Discussion List: http://philosophy.lander.edu/srhelp/
srhelp Discussion Archive: http://philosophy.lander.edu/srhelp.archive/
mfforum Philosophy Board: http://philosophy.lander.edu/cgi-bin/mwf/forum.pl
Scientific Reasoning FAQ: http://philosophy.lander.edu//faq.html
Philosophy Chat: http://philosophy.lander.edu/chat/
Online Grades: http://philosophy.lander.edu/~larchie/phil-pwa

1.2 Appointments—Office Hours

I look forward to talking to each of you about our scientific reasoning course. You are warmly encouraged to stop by my office to discuss classroom lectures, papers, ideas, or problems. If the stated office hours do not fit your schedule, other times can be arranged. Online office hours are from 8:00 to 9:00 PM on the evening prior to tests via Philosophy Chat at http://philosophy.lander.edu/chat/.

1.3 Email Protocol

If you have a personal question, concern, or problem, email your instructor at the first opportunity. If you have questions about class procedures (class policies, homework problems, class requirements, grading, assignments, or other housekeeping matters), post online to the mfforum Scientific Reasoning Message Board. Also if you have questions about class content (philosophical concepts, conceptual questions, or understanding the subject-matter of philosophy), post online to the mfforum Scientific Reasoning Message Board. Messages from your instructor concerning changes in class policies, procedures, or scheduling will be sent via email to the srhelp Discussion List. If we can observe these protocols, all persons in the class will have access to the same information concerning class procedures and class content. If you forget to observe the email protocol, I will request in the interest of fairness to other members of the class that you submit your question to the appropriate list or board so that information can be available to all.
1.4 Logic Lab

A small Logic Lab in LC M33 consisting of three networked computers is open to all philosophy students during office hours stated above. Students are encouraged to stop by the Lab to set up email accounts, practice with online quizzes and tests, check lecture notes, check the srhelp discussion list, read the mwforum Message Boards, or research topics in scientific reasoning on the Internet.

1.5 General Education Core Requirements

Note especially: Although Phil. 203 fulfills the General Education Core Curriculum Requirement for Logical and Analytical Thought, this course does not fulfill the requirement for the Humanities requirement. If you are seeking to fulfill the Humanities requirement by registering for a philosophy course, you need to enroll in Philosophy 102: Introduction to Philosophical Inquiry.

2 Course Description

2.1 Catalog Course Description

“A survey of the methods of induction and experimental inquiry. Classical and contemporary inductive logic are considered with special emphasis on justification, conditional arguments, testing theoretical hypotheses, decision analysis, Mill’s Methods of Induction, epistemic probability, and the “logic” of scientific discovery. Three semester hours.” From the Lander University Catalog 2002-2003

2.2 Textbook


2.3 Purpose of the Course

The general purpose of this course is to introduce some of the main problems of inductive logic and to focus on distinguishing good reasoning from poor reasoning. The approach is two-sided: (1) the analysis and classification of fallacious reasoning and (3) the analysis and construction of correct reasoning.

2.4 Objectives of the Course

The general aims of our scientific reasoning course are

1. What are the differences between arguments and explanations?
2. What are the differences between deductive and inductive reasoning?
3. What are the common fallacies in scientific reasoning?
4. What are the techniques for definition and classification in science?
5. What are hypothetical reasoning and the patterns of scientific discovery?
6. What are presuppositions of experimental inquiry?
7. What are the main patterns of scientific investigation?
8. What are crucial experiments and *ad hoc* hypotheses?

### 2.5 Specific Skills Achieved

Upon completion of this course, all students should be able to

1. demonstrate basic skills of Internet research, email, Majordomo Discussion Lists, and Message Boards,
2. distinguish clearly among factual, attitudinal, and verbal disputes in science,
3. construct premisses and conclusions for inductive arguments,
4. identify the common fallacies in scientific discourse,
5. evaluate various types of scientific reasoning,
6. identify the differences between good science and pseudoscience.
7. understand the essential role of definition and event description in scientific analyses, and
8. understand the limitations of current theories of the patterns of experimental inquiry and the logic of discovery.

### 2.6 Narrative Description of the Course

Inductive reasoning (scientific reasoning) has many similarities with the kind of reasoning used by Sherlock Holmes in the works by A. Conan Doyle. This kind of reasoning involves the claim, not that reasons give conclusive evidence for the truth of a conclusion, but that they provide some support for it. This course complements Philosophy 103: Introduction to Logic, but you need not have taken that course to do well in the Scientific Reasoning course. They are entirely independent courses.

A unique feature of the course is the study of some examples of pseudoscience. Many other examples studied are topics taken from *Scientific American*, *American Scientist*, *Science*, *Nature*, and *Science News*.

The heart of the course, however, emphasizes the inquiry into the basic methods of inductive or probabilistic inquiry and the investigation of techniques for solving problems under uncertainty. You will learn some effective methods of
inquiry, analysis, and criticism in the fields of the physical, social, and political sciences.

This study of scientific reasoning involves a survey of the methods of induction and experimental inquiry. Classical and contemporary inductive logics are considered with a special emphasis on justification, conditional arguments, testing theoretical hypotheses, causal hypotheses, decision analysis, Mill’s Methods, and the "logic" of scientific discovery.

Providing a rational reconstruction of the methods of science is one of the most difficult areas of research in philosophy and science. Many of the fundamental problems have not yet been satisfactorily solved, and many of these problems appear at an elementary level of the subject. No scientist claims absolute knowledge; the foundations of science change and are reformed as an on-going process as paradigms change. Even though science is only probabilistic knowledge, it is knowledge in a genuine sense. Deductive knowledge, on the other hand, is, in a significant sense, trivial because it relies on the meaning of symbols, words, syntax, and convention.

Although the different sciences you study in college utilize different methodologies of inductive logic (scientific reasoning), the underlying schemata are presupposed by instructors and usually not explicitly formulated for the student. This course provides the skills necessary for understanding the nature, scope, and limits of the methods used in those courses. In sum, Philosophy 203: Scientific Reasoning not only provides an introduction to the various methodologies of the social and natural sciences but also, as well, fulfills the General Education Core Curriculum requirement for logical and analytical thought.

The class periods are composed, for the most part, of lecture, case studies, simulations, and problem solving.

2.7 Course Procedures

The methods used to obtain these ends are

1. to learn to identify inductive arguments, to evaluate and counter them, and to construct good arguments,

2. to obtain the ability to relate arguments to one another and to judge the relative strength of different kinds of inductive arguments,

3. to analyze different techniques of definition and kinds of meaning in the sciences,

4. to obtain the ability to identify common mistakes in scientific reasoning and to reconstruct inductive generalizations,

5. to gain skill in evaluating scientific explanations and patterns of investigation,

6. to recognize the differences between the inductive and deductive sciences and how they differ from the pseudosciences,
7. to recognize the difference between \textit{a priori} presuppositions and \textit{a posteriori} principles,

8. to study classic, influential, and abiding methods of experimental inquiry into the nature of causation,

9. to understand how natural processes can be systematically discovered and clarified through experimental design and crucial experiments,

10. to apply usefully the several methods of inductive reasoning in everyday life and ordinary language.

In this course you will gain skill in asking interesting, productive, and insightful questions and will analyze scientific passages to obtain facility in the clear, complete, and methodological understanding of their content. You will also learn effective methods of analysis and criticism in the evaluation of inductive argumentation.

2.8 Teaching Methods

We adopt specific techniques recommended by many educators, namely lecture, discussion, review tests and quizzes, a paper, homework, and computer applications, including word-processing, online discussion list, message boards, chat, and online supplementary material.

3 Course Requirements

3.1 Evaluation

Judgment about the progress of your work is based on the quality and depth of critical and constructive thinking exhibited on tests, quizzes, homework, and message board. Your course grade is determined by averaging the points you achieve from the following scores:

- **Test 1** Language and Argument
- **Test 2** Definition and Fallacies
- **Test 3** Analogy and Causal Connection
- **Test 4** Patterns of Scientific Investigation
- **Quiz Average** Summation of Best Ten Quizzes—(including \textit{mwform} Message Boards, homework, special problems, and paper or project)
- **Final Examination** Comprehensive Four-Part Test—(optional parts, to be averaged with any of the respective Tests 1–4 above)

Your final course grade is assigned according to your final average. A grade-calculation worksheet is provided for your convenience in the Appendix to this Syllabus.
3.2 Grades

Judgment about the progress of your work is based on the four test scores and quiz average. The course is essentially performance based and consists of a progressive series of concepts to be learned and mastered. For this reason, few students can do well in this course by “cramming” before exams. Normally, the course is not difficult if you attend class, keep up with the reading and notes daily, seek help on the message board, and do not attempt to learn a large amount of information in a short amount of time. A six-part distillation of notes on “How to Study” for this course is available on the Web at http://philosophy.lander.edu/study.html and is well worth reading.

3.3 Tests

Tests are usually a combination of objective, short answer and problems. The subject-matter is primarily based on the reading, lecture notes, and homework assignments. In general, if you understand how to do the homework problems, you will do well on tests.

Even though tests are based on questions from the homework and reading assignments, unlike the quizzes, the tests are neither based on memorized facts nor based on objective information derived from memorized arguments. Instead, the emphasis given in tests is on the operation and active transformation or manipulation of the concepts learned. Some examples of the difference between the figurative knowledge used in quizzes and the operational knowledge used in tests are given in the Appendix to this syllabus. Occasionally, some particularly difficult optional questions are included for extra credit.

On essay-type questions, be sure to answer with complete sentences; answers provided as lists of phrases or the names of concepts, alone, do not reflect an understanding of the subject and usually will be given little, if any, credit. Example tests, quizzes, and lecture notes, are online at http://philosophy.lander.edu/scientificreas/.

Test Review Worksheets are provided in the Appendix to this syllabus and form an excellent basis for studying for tests.

3.4 Quizzes

Quizzes can consist of as many as six different kinds of work: (1) announced or unannounced in-class quizzes, (2) homework problems, (3) special problems, (4) posts to mwforum Philosophy Message Board for discussion, (5) papers, and (6) comments on papers.

In-class quizzes are short specific questions written in class on an explicit logic topic or problem. The quiz topic is usually announced in advance of the quiz, and the topic has been thoroughly explored in a previous class. See http://philosophy.lander.edu/scientificreas/quizzes.html for online example quizzes. Your quiz average is based on the best ten scores from the following items.
1. Web Practice Sheet—(required) homework assignment (cf. Appendix Work-
sheets)

2. *mwforum* Discussion Message Board—(optional) posts pertaining to class
policies, procedures, or homework (two points per post or comment on a
post per day), for a maximum of ten points on one quiz

3. *mwforum* Discussion Message Board Paper—(required) a summary essay
analyzing a pseudoscience topic, a topic in scientific reasoning, or informal
fallacies (one quiz or ten points)

4. *mwforum* Comments—(required) comments posted to papers on the Sci-
entific Reasoning Papers Message Board (two points per post for a maximum
of ten points for one quiz)

5. Quizzes and Homework—(individually optional) remaining highest class
quizzes as scheduled in the syllabus, unannounced quizzes, special prob-
lems, and homework assignments

### 3.5 srhelp Majordomo Discussion List

The Majordomo mailing list *srhelp* is an important part of our philosophy
course. *srhelp* is a forum for communication between classes for housekeeping
matters such as hints for special problems, homework exercises, class announce-
ments, and scientifically newsworthy events. All posts are automatically sent
via email to other members of the list. You are encouraged to post examples or
items of interest concerning scientific reasoning in the larger world. In addition,
*srhelp* might be a good place to seek information about topics that go beyond
class content.

For this aspect of the course, you will need an email account. All new
and returning students have Lander email accounts based upon username and
password (4-digit PIN number issued during registration procedures). If you do
not know your PIN number and password, please see a lab assistant at the help
desk on the second floor of Laura Lander Hall. The lab assistant will help you
find your username and password and explain how to use Lander’s Web-based
email. If you prefer, I will be glad to help you become familiar with Web-based
email in the Logic Lab, Learning Center M33, during the office hours stated at
the beginning of this syllabus.

The Office of Computing Services has set up a server whereby you can check
your email on the following Web page: http://student.lander.edu/webmail/. In
order to minimize the possibility of getting spam (unwanted email) to your Lan-
der email address, you might want to set up a Web email account with a free In-
ternet service such as http://www.hotmail.com/ or http://www.yahoo.com/. A
directory of free email accounts is provided at http://www.emailaddresses.com/
but the two mentioned above are usually rated highly by independent evalu-
ators of free email services. **Important:** If you use a free email account, you must
configure the account to send text messages only.
Instructions for configuring your Hotmail or Yahoo email account are similar for many other Web-based email accounts.

1. For Hotmail, click on “Compose” for a page for a new email and the Tools menu to appear. (If you want to type a signature first go to “Options” as in Figure 1.)

![Figure 1: Configuring Hotmail for Text-Only and a Signature](image1)

2. After clicking “Compose,” click on the “Tools” drop-down box. Finally, click “Rich-Text Editor ON” if it appears in order to toggle it off. Your email will now be composed in text-only.

![Figure 2: Click on "Rich-Text Editor ON" to Toggle Off Rich Text](image2)

The most convenient way to join srhelp is to type in the following URL (the address) in your browser: [http://philosophy.lander.edu/srhelp/index.html](http://philosophy.lander.edu/srhelp/index.html).

1. Type in your email address in the form on the left-hand side of the page and click the “Submit Query” button as in Figure 3.

![Figure 3: How to Subscribe to srhelp](image3)
2. You will receive on-screen confirmation of your application, and you will receive verification in your email account within a few minutes.

3. Reply to the email with the authorization command placed as the first line in the body of the message. That’s all there is to it.

4. You will receive a final reply welcoming you to the srhelp Mailing List.

To submit a message to srhelp, send it to srhelp@philosophy.lander.edu and Cc a copy to yourself to verify that the message arrived, as in the example in Figure 4. If you do not Cc a copy to yourself, you will not receive a copy of your own message.

![Figure 4: How to Post a Message to srhelp](image)

If email is new to you, please stop by the Logic Lab in the Learning Center M33 during office hours, and I will be most happy to show you how to use Lander’s Web-based email, how to sign up for srhelp, and how to send email.

When you post messages to srhelp, please observe the following guidelines:

1. **Include a clear and precise subject-line.** Subjects such as “test,” “quiz,” “problem,” or “question” are not specific enough to be of help for search engines. When responding to a previous message, type your subject-line with a “Re:” before the subject given in the subject-line of the previous message. A simpler way to respond to a previous message is by clicking “Reply to All” in your email client; this click will automatically set the subject-line of your email so that your message is part of the appropriate message thread.

2. Spam, chain letters, flaming, and other kinds of inappropriate content are expressly prohibited and can result in the sender’s suspension from the
list. **srhelp** is moderated, so it could take up to 12 hours before your message is posted. Again, if you wish to receive a copy of your message, be sure to Cc it to your email address, as explained above.

3. **Include your name and email address** in the message body even though your name and address is in the “From” line in the message header.

4. Finally, as should be usual with email etiquette, **do not use all capital letters in your posts and do not use attachments.**

Your message to **srhelp** is archived on the philosophy server and can be accessed after . To see previous posts and to search for information in previous posts, click on the **srhelp Archives** link on the Philosophy Homepage or the Other Services page on the Philosophy Web. When the Archive page loads, scroll to the very bottom of the screen, and click at the bottom of the screen on the INDEX for the month you are interested in. For specific directions, see the Web Practice Sheet in the Appendix and compare the composite image labeled Figure 5 with the onscreen page.

![srhelp Mailing List Interface](image)

**srhelp Mailing List Interface**

You can search or browse the archives.

[10]

Scroll Down and Click on the Index for the Month

Browse the srhelp Archives

January, 2008: [Index][Thread][Raw Archive (2566 bytes)]

srhelp-owner@philosophy.lander.edu

Figure 5: How to Access the **srhelp** Archives

3.6 **mforum** Philosophy Message Board

The **mforum** Message Boards are an important part of obtaining help in real time from your classmates and from your instructor. You are encouraged to post questions, problems, or answers on any topic relating to the course policies, procedures, or homework of our philosophy class. Your post is placed directly on the Philosophy Web and can be immediately accessed by anyone in the world. The Scientific Reasoning Message Board is a good place to obtain a
pre-evaluation of your homework or to seek answers to homework problems.

The purpose of the *mwforum* Message Board is to discuss the daily class activities of our scientific reasoning course: homework questions, homework answers, housekeeping matters, class procedures, assignments, test dates, and class policies. Cookies must be enabled on your computer for you to be able to use the *mwform* Message Board.

1. On the Philosophy Homepage, click on the “*mwforum* Message Board” link.

2. From the *mwforum* Philosophy Forum page, click on the “Register” tab at the top of the page.

3. Fill in a username and your email address—taking care to remember the username you have chosen. Click on the ”Register” button.

4. In a few moments, a password will be sent to your email address. See Figure 6 for a screenshot.

5. Now when you go to the *mwforum* Message Boards, click on the “Login” link at the top of the screen, and a login page will load. Log in with your username and the password you have just received via email. Be sure to take note of your password—perhaps, by saving the email message or writing it in the margin of this syllabus. Next, click the “Login” button. See Figure 7.

6. When the Philosophy Forum page loads, click on the *mwforum* Message Board of interest. If you lose or forget your password to the *msforum* Message Boards, click on the Login link on the upper-right of the *mwforum*Homepage:
Figure 7: How to Login to mwforum Message Boards

http://philosophy.lander.edu/cgi-bin/mw/forum.pl

7. At the bottom of the Login page in a box labelled “Request Password,” fill in your username in the username bar and click the “Request” button. Your password will be sent to you via email. (If you have forgotten your username also and you have posted to the Message Board at least once in the past, then find your message on the Message Board and record your username.)

8. (You need to log in to the mwforum Philosophy Forum in order to post messages, comments, or papers, but you need not log in just to read the messages.)

9. If you wish to submit a message, click on “Scientific Reasoning Discussion” under the “Scientific Reasoning” heading. If you wish to post your paper, click on “Scientific Reasoning Papers” under the “Scientific Reasoning” heading. When the “Scientific Reasoning Papers” page loads, click on the “Post Topic” link. See Figures 8 and 9.

10. Type in the spaces provided the title of your post in the “Subject” bar and the text of the post in the “Message Body” area. You can “copy and paste” your post into the “Message Body” area from a word-processing program such as Microsoft Word or Notepad, if you wish. To copy and paste, with your mouse, highlight the text in your word-processing program, and for the Copy, press the Control Key and at the same time the letter “C.” For the Paste, click the mouse anywhere in the Message Body area, and press the Control Key and at the same time the letter “V.”

When you log in to the mwforum Scientific Reasoning Message Board for the first time, you should enter personal information on your Profile page. Login
and click on the "Options" link at the top of the Forums page. On the Profile page, you can type in a more easily remembered password if you wish to do so. Also, be sure to enter your real name. If you wish to hide your email address, check the appropriate box.

Unless you enter your real name on your profile page your posts cannot be tabulated, and your posts cannot be credited. Any information entered here is available to the anyone in the class or, for that matter, anyone in the world. You need not give out any personal information if you do not want to do so.

If you click “Options” at the top of any page after you have logged in, you can find out how many times you have posted as well as find out about other personal data. To do so, click “Info” on the same line as your username on your Profile page. See the composite screenshot in Figure 10. Next, click on the “Posts” link for a list of all your messages. Also, if you wish you can type in a different more friendly password. Remember to scroll down to the bottom of the page and click “Change” or your changes will not permanent.
3.7 Philosophy Papers

Your short scientific reasoning paper, which counts as a required quiz grade, can be (1) a short translation of a passage in science from Spanish, French, or German to English chosen from online texts or library sources (described in the Appendix), (2) a commentary on a short paper or essay on scientific reasoning chosen from online texts or library sources (also described in the Appendix), or (3) a scientific reasoning project on fallacies, definition, or your own choosing.

Your paper or project is to be posted to mwforum Scientific Reasoning Message Board Papers where other students can comment or ask questions online about your paper by posting messages underneath it.

The modern language option is an alternative to write a short translation of a work in French, German, or Spanish instead of doing a scientific reasoning paper or project. If you choose to do a translation in place of a position paper or project, you must (1) consult with your instructor and (2) find a mentor (or professor) in your language. More information on this option is given in the Appendix to this syllabus.

3.8 Philosophy Chat

One of the services provided by the Philosophy Website is an pretenseless Chat program written by Tommi Leino with a CGI Web interface constructed by John Archie. Jicra is a very simple IRC client Java applet—a one channel Chat room without IRC commands or other features. No special knowledge or skill is necessary to use this applet; however, Java must be enabled on your computer for you to be able to use the program. If you know how to use miRC you are welcome to connect to the Chat with that client.

The Philosophy Chat is available for student use at any time for any university-related purpose (e.g., you are welcome to use the Chat for any group-project discussion in any class at Lander for the convenience of students both on and off campus). You can devise your own channel for Chat simply by having your
group type in whatever specific name you choose for your group. Only persons aware of the name of your channel can join. In past semesters, the Chat has been useful for off-campus students to keep in touch.

We will use Chat in the default channel called “philosophy” for online office hours on the evening before tests are given. The Jirca Chat program operates like this:

1. From the Philosophy Homepage click on the chat link in the lower-left corner of the page. See Figure 11.

![Figure 11: How to Open the Chat Program](image)

2. When the login page loads, enter your screen name and your real name. You can chat without a screen name or real name entered, and a name like "guest" will be assigned to you. Click on the login button. See Figure 12.

![Figure 12: How to Login to the Chat Program](image)

3. When the Chat window loads, type your message in the bar at the bottom of the window, and hit the enter key, and your message can be read by all persons logged onto the chat. See Figure 13.

![Figure 13: How to Chat](image)

3.9 Grade Evaluation

Your final course grade is assigned according to your final average as described above in the subsection “Grades.” The number of hours advised to study given
below is usually an accurate guide to how well you will do in this class. If you
study only for tests, your doing well in the course is doubtful. Many students
assume they can do well in philosophy without doing homework and without
studying outside of class because they have been able to do so in other high
school or college classes. Since these students have become habituated to passing
courses without much study, they are often alarmed to discover our philosophy
course is substantially different from what they have expected.

A (90 points or above) reflects approximately two hours study per class hour;
a great deal of time, thought, and effort; and mastery of the subject.

B (80 or above but below 90 points) reflects approximately one hour study per
class hour; above average time, thought and effort; and superior achieve-
ment.

C (70 or above but below 80 points) reflects approximately one-half hour study
per class hour, average time, thought, and effort; and average achievement.

D (60 or above but below 70 points) reflects cramming for examinations; min-
imum time, thought, and effort; below college level work; a less than
adequate grasp of the course content; and less than satisfactory achieve-
ment.

FA reflects attending fewer than 75% of class meetings.

INC can only be given in cases of sudden illness or emergency.

3.10 Grades Online

You may access your grades online at any time on the philosophy server with the
username and password handed out in class. No other username and password
will work for this purpose. From the Scientific Reasoning Homepage, under
the gray heading entitled "Class Grades," click on the yellow link “Scientific
Reasoning" as shown in Figure 14. When the Grades Login page loads do the
following:
1. Choose your class from the drop-down box. *Note:* If you log in incorrectly, be sure to re-select your class from the drop-down box because an incorrect login will re-set the class to a default philosophy course. See Figure 15.

### Philosophy Grades Login

![Figure 15: How to Log in for Grades](image)

2. Enter your username *exactly* as written the slip of paper given out in class.

3. Enter your password exactly as it is written on the slip of paper given out in class.

4. Also, enter your username and password here in the syllabus for additional assurance your username and password will not be lost:

   Password: 
   Username: _______________________

5. The login process is case-sensitive—be sure to match the case of the letters—capital or lower case. If you obtain the result of “bad login,” check to see if the Caps Lock key is on, or you have confused the letter “I” with the number “1” or with the capital letter “I.” Occasionally, the number “0” can be confused with the capital letter “O.”

Confidentiality of student grades is a serious concern. For this reason, if you lose your password, your password will be replaced with a different one. *Passwords are not issued to friends, over the telephone, or in email.* Passwords will only
be replaced in the Learning Center room M33 during office hours. Replacement passwords are only available during the regular semester. (During the Final Exam period, normal office hours are not observed.)

### 3.11 Your Job

Our course is not difficult if you keep up with the assigned work. At the very beginning of the course, you need to ask yourself if you can spend at least three hours a week studying just for Scientific Reasoning. If work or family responsibilities interfere with this minimum number of study hours, you should not attempt this course.

When you seek help from me during office hours, the first items I will check are your posts to the mwforum Message Boards, your class notes, book notes, and homework problems—so that I can know where to begin. When a student claims he or she did not understand the subject well enough to ask any questions, take any notes, or attempt any homework, I am usually left with the impression the student has not attempted studying. A good place to see how to study in our course is the “Notes on How to Study” on the Web at http://philosophy.lander.edu/study.html. In past semesters, many students have found these study tips helpful.

- Come to class prepared.
- Take notes in class.
- Take notes on the important points of the assigned reading.
- Do all homework problems. If you cannot find time for doing homework, you cannot benefit from this course of study.
- Ask questions in class, on the discussion list, in Chat, and on the message board.
- Seek help at the first sign of difficulty after the material has been covered in class: srhelp, mwforum, and office visits.
- Make extensive use of the available online lectures, sample problems, quizzes, and tests.

### 3.12 My Job

We will find that inductive reasoning is quite essential in all fields of endeavor.

- I will attempt to create the conditions under which you can exercise your native curiosity.
- Class lectures will be varied, and specific concrete examples will be used for illustrating the theoretical points.
- I will show practical applications for all the inductive methods employed.
• I will provide handouts and Web-based instructions for additional problem-solving support.

If I do my job correctly, our scientific reasoning course will be one of the most valuable in your university career.

3.13 Class Policies

The following policies are explicitly stated here because these policies help protect fairness for the administration of the course for the class as a whole. Some of these policies are generally assumed in most classes at Lander University.

Make-Up Policy: Unfortunately, the Humanities Division does not provide space for offering make-up tests and quizzes. No tests or quizzes can be specifically made-up per se during the regular semester in this course even though students might have good reasons for missing class. Thus, prior to the final exam tests cannot be made-up during the regular semester for any reason. If you miss one or more regularly scheduled tests during the semester with a written excused absence, your grade for that test or tests is established by the grade achieved on the appropriate section of the comprehensive final examination. An excused absence is granted for emergency situations only, and a written excuse must be provided. For example, if you had to miss the first test on “Language and Argument” because of a medical emergency, your grade on that test would be established by your grade achieved on the section of the final examination dealing with “Test I: Language and Argument.” No quizzes can be made up for any reason; instead, the highest ten quiz grades are selected from a large number of quizzes offered. Very few persons will be able to take all quizzes.

Late Papers: Papers, commentaries, informal fallacy or other projects, or modern language translations must be posted to the mwforum Scientific Reasoning Papers Message Board by midnight of the due date or a penalty of 10% per day late is applied.

Plagiarism: Students are expected to do their own work in this course. To use another writer’s or speaker’s ideas without giving credit by means of standard documentation is plagiarism. All cases of academic dishonesty on tests, quizzes, projects, or papers will be handled in accordance with the Academic Honor Code as presented in the Lander University Student Handbook. Cases of plagiarism or academic dishonesty will be brought before the Honor Council where you will have an opportunity to explain your point of view.

Class Attendance: Students are expected to attend all classes; there are no “free cuts.” In the case of unavoidable absences, you are responsible for making up work done in class. In accordance with University policy, if you attend less than 75% of the scheduled class meetings, you will not
receive credit for the course. As a matter of fact, this policy is expressly in your interest, especially in this course, since attendance is essential for understanding and analyzing some of the complex argumentation discussed. Any student arriving late for class or leaving early from class will be counted absent from that class period. Specifically, if you take a quiz and leave before class is dismissed, you will not receive credit for that quiz. (This policy is important because understanding some of the complex reasoning process covered in this course is at the heart of doing well in scientific reasoning.) Anyone missing class is responsible for obtaining the class notes and assignments from a classmate or from the Web resources. Additionally some book notes, quizzes, sample tests, and a few class lectures are online at http://philosophy.lander.edu/intro/. The mforum Discussion List is a good place to ask for information about assignments, subjects covered in class, or class policies—especially if you are hesitant to ask a classmate for assistance. In fact, posts to the mforum Discussion List are the basis of an optional quiz grade. If you have questions about the subject-matter of philosophy beyond the class topics, by all means make use of the srhelp Discussion List. Finally, be sure to contact your instructor as soon as academic difficulties first arise.

**Learning Disabilities:** If you have a physical or learning disability and you require special accommodations, be sure to contact Mr. Lafayette Harrison (Learning Center 345, telephone (864) 388-8814) and provide him with appropriate documentation. When Mr. Harrison is made aware of your disability, he will inform your instructors every semester unless you ask him in writing not to do so. For additional information, see the “Disabled Student Information” on the Lander University Website at http://www.lander.edu/instructional_services/disabled.htm.

**Closing of the University:** If hazardous weather conditions or any other state of emergency necessitate University closing, the information will be available from the Lander automated information system (telephone (864) 388 8400) or any of these other public sources:

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<thead>
<tr>
<th>Television</th>
<th>Radio</th>
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<tbody>
<tr>
<td>Channel 4: WYFF</td>
<td>WCRS AM-1450</td>
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<tr>
<td>Channel 7: WSPA</td>
<td>WMTY AM-1090 FM-103.5</td>
</tr>
<tr>
<td>Channel 13: WLOS</td>
<td>WSCZ FM-96.7</td>
</tr>
<tr>
<td>Channel 21: WHNS</td>
<td>WZLA FM-92.9</td>
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<td>WMYI FM-102.5</td>
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<td></td>
<td>WSSL FM-100.5</td>
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A Test Review Sheets

A.1 Test 1: Arguments and Language

Important Concepts: be able to characterize and give examples.

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<thead>
<tr>
<th>Philosophy</th>
<th>Implicit Conclusion</th>
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<tr>
<td>Logic</td>
<td>Conclusion Indicator</td>
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<tr>
<td>Inference</td>
<td>Premiss Indicator</td>
</tr>
<tr>
<td>Entailment</td>
<td>Conditional Statement</td>
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<tr>
<td>Proposition</td>
<td>Explanation</td>
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<tr>
<td>Statement</td>
<td>Deduction</td>
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<tr>
<td>Sentence</td>
<td>Induction</td>
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<tr>
<td>Argument</td>
<td>Truth</td>
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<tr>
<td>Premiss</td>
<td>Validity</td>
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<tr>
<td>Conclusion</td>
<td>Soundness</td>
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<td>Forms of Language</td>
<td>Types of Sentences</td>
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<tr>
<td>Functions of Language</td>
<td>Expressive Use</td>
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<td>Informative Use</td>
<td>Factual Significance</td>
</tr>
<tr>
<td>Directive Use</td>
<td>Disagreement in Belief</td>
</tr>
<tr>
<td>Disagreement if Attitude</td>
<td>Emotive Significance</td>
</tr>
<tr>
<td>Methods of Resolution</td>
<td>Slanted Language</td>
</tr>
<tr>
<td>Phatic Language</td>
<td>Performative Utterances</td>
</tr>
</tbody>
</table>

Important Skills: be able to work the following kinds of problems

1. Diagram, using the standard method, simple and complex arguments.
2. Identify premiss and conclusion indicators.
3. Identify statements and nonstatements.
4. Identify various kinds of nonarguments.
5. 

Important Distinctions: Be able to list differences and give examples.

1. Sentence and statement
2. Argument and explanation
3. Deduction and induction
4. Truth, validity, and soundness
A.2 Test 2: Fallacies and Definition

**Important Concepts**: be able to characterize and give examples.

- equivocation
- complex question
- division
- appeal to the people
- appeal to ignorance
- attack on the person
- hasty generalization
- slippery slope
- stipulative definition
- precising definition
- persuasive definition
- operational definition
- begging the question
- false dichotomy
- composition
- appeal to authority
- appeal to emotion
- genetic fallacy
- false cause
- fallacy
- lexical definition
- theoretical definition
- ostensive definition
- genus and difference

**Important Distinctions**: be able to list differences and give examples.

- formal fallacy
- connotation
- intension
- informal fallacy
- denotation
- extension

**Important Skills**: be able to work the following kinds of problems

1. Identify types of definitions.
2. Evaluate definitions by the rules for definition by genus and difference.
3. Relate the kinds of definitions with the purposes of definition.
4. Classify by a diagram a group of objects or events by intension and extension.
5. Use definitions to resolve verbal disputes.
A.3 Test 3: Analogy and Causal Connections

**Important Concepts**: be able to characterize and give examples.

- analogy
- descriptive analogy
- sufficient condition
- method of agreement
- joint method
- method of concomitant variation
- argumentative analogy
- necessary condition
- contributing condition
- method of difference
- method of residues

**Important Problems**: be able to explicate the following questions.

1. Be able to evaluate analogical arguments by analogical criteria.
2. Be able to refute an argument by means of devising a logical analogy.
3. Be able to diagram and evaluate causal connections in terms of Mill’s Methods: agreement, difference, joint, residues, and concomitant variation.

**Important Distinctions**: be able to list differences and give examples.

1. explanatory and argumentative analogy
2. weak analogy and strong analogy
3. necessary and sufficient conditions
4. method of agreement and method of difference
A.4 Test 4: Patterns of Scientific Investigation

Important Concepts: be able to characterize and give examples.

- science
- theoretical science
- scientific explanation
- verifiable hypothesis
- direct testing
- crucial experiment
- hypothesis
- descriptive law

- technology
- engineering science
- non-scientific explanation
- falsifiable hypothesis
- indirect testing
- *ad hoc* hypothesis
- theory
- prescriptive law

Important Problems: be able to work the following kinds of problems.

1. What are some of the ways scientific theories are evaluated?

2. Show how the general pattern of scientific research is employed by analyzing a summary of a scientific inquiry discussed in an article from a scientific journal and magazine.

3. Show how the selection of facts is theory-dependent. Explain and identify the hypothetical character of classification and description.

Important Distinctions: be able to list differences and give examples.

1. verifiable and unverifiable
2. observable and theoretical
3. science and pseudoscience
4. facts and theories

B Example Test and Quiz Questions

See http://philosophy.lander.edu/intro/ for online tests and quizzes given in previous classes. Quiz questions are based on the main ideas presented in the readings and the class lecture and discussion of the readings. These questions are drawn from facts, definitions, meaning of concepts, and statement of arguments. Generally, the subject of the quiz is a specific body of acquired information that can be learned by attentive reading, underlining in the text, active listening, and, as a last resort, memorizing. Perhaps, the quiz subjects can be thought of as the passive transference of a set body of information from one source (teacher, reading, or student) to another (student).
For many people these passive methods are not in themselves exciting and motivating. Self-initiated activity and shared inquiry are much more interesting than reinforced obedience. For this reason, test questions are based on the information learned for quizzes, but go well beyond rote learning. Tests present the opportunity to play with the ideas, relate them to each other, and operate with them. The best way to prepare is by free activity and thinking about the course content. This is probably the only kind of learning which is meaningful and authentic because it relies on your interest and initiative for its own sake. The difference between passive and active learning can be illustrated by the following example question as asked on a test and a quiz. Suppose that “epistemology” has been defined as “the study of the nature, scope, and limits of human knowledge.”

**Quiz Questions**

1. What is epistemology?

2. Epistemology involves the study of knowledge (True / False).

3. __________________________ is the discipline concerned with not only what knowledge is but also what can be known.

**Sample Test Questions**

1. The epistemologist attempts to answer the question:
   a. How do we determine the ultimate nature of reality?
   b. What are hypotheses, theories, and laws?
   c. How do we determine whether our beliefs are true?
   d. What is the difference between deduction and induction?
   e. What are the ultimate generalizations of the human intellect?

2. Explain the nature of epistemology, distinguish the major divisions, and characterize an example of an epistemological problem for each division.

3. Do any areas of human inquiry not involve epistemological problems? Explain your reasoning and cite examples wherever possible.
C Philosophy Worksheets

*Suggestion*: Take your time and read each step carefully; confusion can easily ensue by skipping or skimming instructions.

C.1 Web Practice Worksheet

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Open your Internet browser ((e.g., \text{Internet Explorer or Netscape})). Enter the address: (\text{<a href="http://philosophy.lander.edu/%7D%5C">http://philosophy.lander.edu/}\</a>) in the Address or Location Bar. ((\text{Note that there is no www in the address.})) This page is the Homepage for some philosophy courses. What is the title of the page as shown in the title bar at the very top of the screen? ((\text{The page title is usually followed by the name of the browser.}))</td>
<td></td>
</tr>
<tr>
<td>2. Click on the link OTHER SERVICES at the top of the page. When the Other Services page loads, click on the Majordomo Mailing List Archive for this class. When the Mailing List Interface page loads, scroll down to the bottom of the page to browse the Archives. What is the first message of this semester? ((\text{Hint: click on [INDEX] for this month.}))</td>
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<tr>
<td>3. Go back to the Philosophy Homepage and click on the Homepage for this class. When the Homepage loads, click on the Majordomo Mailing List icon for this class. When that page loads, join the Mailing List by entering your email address and clicking “Submit Query.” (Q.v., \text{the instructions for joining the Discussion List in the syllabus under the section entitled “Course Requirements.” What kinds of messages can be posted to the Mailing List?})</td>
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<tr>
<td>Question</td>
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<tr>
<td>4. Check your email for a message with the subject “Majordomo Results.” Where do you send your authorization code in order to authenticate your email address? Send your authorization code as the first line in the message to the address specified; you should get an email confirmation in a moment. (Be sure to have no blank lines, spaces, or typed characters in front of the authorization code, and be sure the message is sent as plain text.)</td>
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<tr>
<td>5. Click on the red &quot;p.l.e&quot; icon at the top left of the page and so return to the Philosophy Homepage. Click on OTHER SERVICES at the top of the page. When the “Other Services” page loads, click on the Majordomo Mailing List “subscribe/unsubscribe” link. When the MajorCool Mail List Manager loads, type in your email address and click the yellow “Go” button. If a “no subscribed list” page loads, repeat step 4. Otherwise, scroll down the Mailing Lists listed. What Mailing List Names have a check in the SUB (i.e., Subscription) column?</td>
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<tr>
<td>6. Using the instructions from the mw-forum Message Board section under “Course Requirements” for this syllabus, register and log in to the Philosophy Forum Message Board for this class. What is the title of the first message of the semester? Post a message in the Discussion area by clicking in the following order: Intro. to Phil. → Class Discussion → Post Topic. In the Subject bar, enter an appropriate title and as a message tell what aspects or aspect of scientific reasoning you are interested in learning about.</td>
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<tr>
<td>Question</td>
<td>Response</td>
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<tr>
<td>7. On the Philosophy Homepage, under the gray heading “Courses of Study,” click on the yellow title of your philosophy course. When the page for your philosophy course loads, click the “FAQ” (Frequently Asked Questions) for your course. Can you exempt the final exam? Can you make up a missed quiz?</td>
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<tr>
<td>8. Find the title for the first lecture of this course. What is the title of the lecture as it appears in the title bar at the very top of the screen?</td>
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<tr>
<td>9. Find the title for the first sample quiz in this course. What is the title as it appears in the title bar at the very top of the screen?</td>
<td></td>
</tr>
<tr>
<td>10. From the Homepage of your philosophy course, click on the “Chat” link. Enter your “Nick” (your screen name or nickname), your real name, and hit the “Enter” key. At the bottom of the window is an unnamed message bar. Type in “Hi.” What is the name that appears in the Chat Window with the message you just typed in?</td>
<td></td>
</tr>
<tr>
<td>11. Find the philosophy search engine called Hippas. Search for the term “a priori.” What is the definition of this term given by the Internet Encyclopedia of Philosophy? If Hippas is offline, use the Internet Encyclopedia of Philosophy.</td>
<td></td>
</tr>
<tr>
<td>12. Open your email client and send the following message to the mailing list for this class in accordance with the email guidelines listed in the “Requirements” section of this syllabus. In the body of the message, state your major, your hometown, your class standing (Freshman, etc.), and your career interests. Be sure to sign your name in accordance with the guidelines before you send the message.</td>
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C.2 Exercise on Statements

Directions: Which of the following sentences are statements?

1. The flower of *Echinacea purpurea* (the purple coneflower) is a useful stimulant.

2. The interior of a conch shell and the outside of a pine cone can be described by the Fibonacci numbers.

3. Planet X exists beyond Pluto.

4. The number of degrees of the exterior angle of any triangle is equal to the sum of the two opposite interior angles.

5. Although it hasn’t been proved beyond a reasonable doubt, frustration causes aggression.

6. The mathematical theory of topology can adequately describe any sculpture.

7. The universe contains intelligent extra-terrestrial life.

8. Carefully remove the precipitate from the centrifuge tube.
9. Friday, January 24, was a great day.

10. Why shouldn’t I make a 3.0 GPA this semester?

11. President Roosevelt knew about the attack on Pearl Harbor in advance.

12. Next season, there will be only five major hurricanes.

13. "We murder to dissect.” (Wordsworth, "The Tables Turned")

14. A freely falling body accelerates rapidly.

15. Twins are two in number.
C.3 Diagramming Arguments

Directions: First study the passages below and state whether or not each is an argument. If it is not, state why not. Second, if the passage is an argument, state whether it is inductive or deductive. Third, if the passage is an argument, diagram its structure using the numbers provided.

(1) Cranberry juice helps kidney infections (2) because persons who drink cranberry juice often do not get many kidney infections.

(2) No one has directly observed a chemical bond, (2) so scientists who try to envision such bonds must rely on experimental clues and their own imaginations.

(3) Be careful who you pretend to be for (2) that you will surely become.

(4) If we are open to our experience, then (2) doing what "feels right" proves to be a competent and trustworthy guide to behavior which is truly satisfying.

(5) One of the reasons why Planet X may not have been found in the past is (2) previous surveys concentrated on the Northern Hemisphere while (3) recent calculations show that Planet X, if it exists, is more likely to be found in the Southern Hemisphere.
(6) Some students absent today are unprepared for this test, since (2) the law of averages dictates that only 10% of students are absent due to illness, and (3) more than 10% are absent.

(7) Joe has creased earlobes and a depressed sternum and (2) these characteristics have been associated with heart attacks, so (3) Joe probably will have heart problems in the future.

(8) If we concentrate on the response we must make when we see a light, we react faster than if we fix out attention on the light itself. (2) Thus, our attitude or expectation influences the speed of our reactions.

(9) Because the apparent daily movement which is common to both the planets and the fixed stars is seen to travel from the east to the west, but (2) the far slower single movements of the single planets travel in the opposite direction from west to east, (3) is is therefore certain that these movements cannot depend on the common movement of the world but should be assigned to the planets themselves.

(10) If students were environmentally aware, they would object to the endangering of any species of animal. (2) The well-known Greenwood white squirrel has become endangered as (3) it has disappeared from the Lander Campus (4) because the building of the library destroyed its native habitat. (5) No Lander students objected. (6) Thus, Lander students are not environmentally aware. (Hint: c.f., modus tollens)
C.4 Exercises on Emotive Significance

Directions: Restate each of the following emotively neutral descriptions of personality by (1) positively slanted descriptions and (2) negatively slanted descriptions in the spaces below. If you want to consult a thesaurus, try the online Meriam-Webster Collegiate Thesaurus at http://www.m-w.com/home.htm or Roget’s Thesaurus at http://humanities.uchicago.edu/forms_unrest/ROGET.html or http://www.bartleby.com/62/.

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<td>0 talkative</td>
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<td>0 intelligent</td>
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<td>0 untidy</td>
<td>0 thoughtful</td>
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</table>
C.5 Exercise on Inductive Reasoning

Write a biography of the man who stated the following quotation. Include dates, education, religion, temperament, politics, culture, and so forth. Spend at least twenty minutes on this assignment by careful analysis and speculation.

If he really does think there is no distinction between virtue and vice, why, Sir, when he leaves our houses let us count our spoons.
C.6 Exercises on Disagreements

Directions: In each of the following interactions (1) state the fact at issue in emotively neutral language, and (2) identify the kinds of agreement or disagreement present.

1. **John:** Adam is a skilled conversationalist.
   **Mary:** No, he is an endless chatterbox.
   
   Fact at Issue:

   John’s emotive significance:
   Mary’s emotive significance:
   Belief:
   Attitude:

2. **John:** Betty is a free and innovative thinker.
   **Mary:** Well, in my opinion, Betty doesn’t pay attention to the ideas of others.
   
   Fact at Issue:

   John’s emotive significance:
   Mary’s emotive significance:
   Belief:
   Attitude:

3. **John:** Bobby kindly offered twenty dollars, money he can ill-afford to donate.
   **Mary:** Bobby hinted he would give only twenty dollars, the cheapskate.
   
   Fact at Issue:

   John’s emotive significance:
   Mary’s emotive significance:
   Belief:
   Attitude:
4. **John**: Little Susie tells her stories with innovative and creative interpretations.  
   **Mary**: You’ve got to be kidding—you call “lying” creative?  
   Fact at Issue:

   John’s emotive significance:  
   Mary’s emotive significance:  
   Belief:  
   Attitude:

5. **John**: Senator James’s address to the committee ran on and on at the hearing.  
   **Mary**: No way. He maintained a sullen muteness at the meeting.  
   Fact at Issue:

   John’s emotive significance:  
   Mary’s emotive significance:  
   Belief:  
   Attitude:
C.7 Exercise on Definitions

Directions: Identify the type of definition in each of the following passages.

1. **Vitamins** are vital nutrients that the body cannot produce on its own. Even minute deficiencies of these compounds produce characteristic disorders. (Wendy Gibbons, "Vitamin or Just Vital?" *Science News*, Vol. 139, No. 21, 332.)


3. Did I detect a slight simile between the lines of "The diagnostic deluge" ...? In that spirit, I would like to propose another addition to the guide to mental disorders. I call it **DAD**, for Disorder Addition Disorder, which seems to afflict those compiling mental disorder manuals. (Thomas D. Moder, "Why Not Add DAD?," *Science News*, Vol. 141, No. 11, 171.)

4. Vanderbilt and Jerry Tersoff ... call their new 168-carbon molecule **buckygym** because of its repeating, jungle-gym-like structure. Using a computer program, they constructed the buckygym by substituting seven-sided rings of carbon where fullerenes typically have five-sided rings: Six-sided rings surround each seven-sided ring, and each six-sided ring is surrounded by alternating six- and seven-sided rings. (E. Pennisi, "Theorists Design New-Look Fullerenes," *Science News*, Vol. 41, No. 6, 85.)

D Informal Fallacy Paper

The Informal Fallacies Project is equivalent to a logic paper (one quiz grade). You are to find and analyze in detail two informal fallacies being used (but not mentioned! i.e., you cannot use fallacy examples taken from logic books) in the source. You are to choose your own resources: newspapers, magazines, books, or journals. All references are to be cited in a standard bibliographical manner. Please keep in mind the following guidelines:

- Newspaper and magazine sources for fallacies should be material published after January 1, 1970. Book and journal sources of any date are acceptable,

- Oral arguments, whether in ordinary conversations, speeches, lectures, or television broadcasts, should not be used unless a written text is published and is available separately.

- Avoid using advertisements as fallacy examples when they are appeals rather than arguments purporting to prove a conclusion.

- Feel free to discuss with your instructor the quality of the fallacies before you write your analysis.

An evaluation of your project is based on the following criteria:

1. Bibliography citation is given in proper form (APA, MLA, Chicago, or Science Citation).

2. The excerpt (or fallacy quotation) should be sufficiently inclusive so that each fallacy is clearly evident: not too brief and thereby committing the fallacy of accent and not too extensive such that irrelevant statements are present.

3. The extensiveness and adequacy of the explanation of how each fallacy is effected is essential for full credit.

4. The format of your paper should be similar to the example illustrated below.

**Fallacy:**

Before considering these developments in detail it is worth asking why such an apparently simple device as the bicycle should have had such a major effect on the acceleration of technology. The answer lies in the sheer humanity of the machine.

Analysis:
The question posed is a composite of several questions: (1) Is the bicycle an apparently simple device? If the answer to this question is "Yes," then a further question can be raised: (2) Did this "apparently simple device" have "a major effect on the acceleration of technology?" If the answer to this question is "Yes," the question is appropriate: (3) How had the bicycle had such a "major effect on the acceleration of technology"? An answer to (1) is not clearly straightforward. An answer to (2) is even less so, and an answer to (3) (provided in the text) is much more doubtful. Most of the technical innovations used in the bicycle (e.g., differential gears, classic diamond frame, tublar frame, ball bearing, pneumatic tire) were developed independently of bicycle technology. Only at this point in the analysis would it be appropriate to raise the question, "Why the bicycle had a major effect on the acceleration of technology?"

Hence although the technology of this "apparently simple device" might be important for the evolution of modern technology, it is a fallacy to presuppose it had a major effect on the future development of technology. The answer provided by Dr. Wilson blurs the distinct aspects of the question he raises and treats it as a simple one; hence the fallacy of Complex Question occurs.

E Scientific Commentary

A commentary is a one or two page synopsis of the central point made in a reading on logic. The paper is to be posted on the Logic mwforum Paper Message Board. All exact quotations are documented, and the article is cited in a standard bibliographical manner. Your paper's content can be contrasted with either I.M. Copi’s position in Informal Logic or with your own logical point of view. Sources are available from the books on reserve at the Larry A. Jackson Library or from the books listed in the bibliography section of this syllabus.

The format of your paper should be similar to the sample paper below:

A Commentary on "Achilles and the Tortoise"

Lewis Carroll's purpose in this short paper is to demonstrate, by means of a reductio ad absurdum argument, that a rule of inference cannot be considered as a premiss of an argument. If a rule of inference is given as one of the premisses, then some other rule of inference must be accepted in order for the argument to be valid. Nevertheless, if this second rule is added to the premisses, then a third rule is needed and so on ad infinitum.

Carroll establishes this point by means of the following argument:

(A) Things that are equal to the same are equal to each other.
(B) The two sides of this triangle are things that are equal to the same.
(Z) The two sides of this triangle are equal to each other (Carrol, 118).
In order for \( Z \) to follow validly from \( A \) and \( B \), the reasoning process must be permitted by a rule of inference:

\[(C) \text{ If } A \text{ and } B \text{ are true, } Z \text{ must be true (Carroll, 118)} \]

Moreover, in order for the argument that \( Z \) follows from \( A \), \( B \), and \( C \) to be valid, another rule of inference is necessary:

\[(D) \text{ If } A \text{ and } B \text{ and } C \text{ are true, } D \text{ must be true (Carroll, 119).} \]

Consequently, according to Carroll the argument can never be completed. If he is correct in this claim, then there is no compelling reason to accept any inference as legitimate. Carroll’s paper is therefore a strong argument for skepticism.

I.M. Copi distinguishes between a logical relation and an argument’s premises and conclusion. One might interpret this distinction to imply that the criterion of the correctness or incorrectness of argument is not part of the specific argument. Since logic is a normative discipline, correct arguments must conform to rules, but this consideration is not a sufficient reason to presuppose that the rules are themselves premises in specific arguments.

While I cannot be certain that I.M. Copi would respond to Carroll’s argument in this way, this distinction (if correct) falsifies Carroll’s assumption that a rule of logic must be a premise. In addition, I.M. Copi defines ”rules of inference” as ”rules that permit valid inferences from statements assumed as premises” (Copi, 704). However, he does not explicitly write that elementary rules of inference are not themselves part of the premises. Indeed, if the rules were to be considered part of the premises, I.M. Copi’s definition would fall prey to Carroll’s argument for logical skepticism.

Notes

F Modern Language Option

Rationale for the Modern Language Option

Many of the ideas, concepts, and insight discussed in this philosophy course originate from a language and culture other than our own. Increased skill in the use of another language can be one of the most broadening cultural components of a liberal arts education. For these reasons, you are given the option of doing a short translation of a French, German, or Spanish passage in place of your philosophy paper.

Some of the advantages of choosing the Modern Language Option include:

- gaining unique insight into the psychology of the structure of a language and its modes of expression,
- obtaining an appreciation for the elegance of another language, and
- beginning to experience scholarly standards of accuracy and precision in writing.

Perhaps, as well, the Modern Language Option will help you develop a lifelong, abiding interest in other languages and their literature.

Requirements for the Translation

To accomplish the Modern Language Option you must obtain permission from a language instructor (or language tutor) and from your philosophy instructor to do a specific philosophy translation of approximately 500 words. One of the most difficult parts of this assignment is finding a suitable short philosophy selection in another language.

You are encouraged to seek help from your instructor, your language professor, or appointed language tutor, but the ultimate responsibility for blending the literal and philosophic meaning into a comprehensible essay in the final translation is yours. The grades assigned to your translation is based on the following requirements:

- appropriateness of subject chosen,
- accuracy of the translation,
- readability of the translation,
- bibliographical source in proper form (APA, MLA, Chicago, or Science Citation)
- length—approximately one page translation, and
- posting on the mwforum Philosophy Papers Message Board.

The grade for your translation is assigned in consultation between your language professor or tutor and your instructor. The translation is equivalent to a paper and counts one required quiz grade.
G Philosophy Assessment

This semester your help is sought to fill out a short assessment survey regarding your philosophy course. The philosophy survey on the Web assesses how specific objectives are emphasized in this course and forms an important part of Lander University’s assessment of philosophy courses. Your judgment and opinion are important; your input will help shape the nature of your philosophy course for future students.

1. In Internet Explorer, Netscape or other browser, type in the Address bar at the top of the page the address http://philosophy.lander.edu/ in order to load the Philosophy homepage.

2. Under the picture of St. Jerome, click on the hyperlink PHILOSOPHY ASSESSMENT.

3. When the password window appears, type “plato” for a username and “philmin” for the password.

4. Fill in the five short questions.

5. You need not type in your name and email address unless you wish to do so. If you submit the form anonymously, the return address will indicate the form was sent from a standard default account on the Server.
6. Click the “Submit” button. Thank you for helping to improve the course!
H Selected Bibliography

H.1 Recommended Readings

The following papers in scientific reasoning are recommended for finding research topics for your scientific reasoning paper or project.


Hanson, N. R. *Perception and Discovery: An Introduction to Scientific Inquiry*. San Francisco: Freeman, Cooper, 1969.


Recommended Readings


Longino, H. E. "Feminist Critiques of Rationality: Critiques of Science or Philosophy of Science?" *Women’s Studies International Forum*, 12 (1989), 261-269.


Nickles, T. "What is a Problem that We May Solve It?" *Synthese*, 47 (1981), 85-118.


H.1 Recommended Readings


H.2 Recommended References

The following works are recommended for finding philosophical research references for your scientific reasoning paper or project. Most are available in the stacks of the Larry A. Jackson Library.


Good online sources for this course are updated on a regular basis on the Philosophy Web Site: [http://philosophy.lander.edu/intro/links.html](http://philosophy.lander.edu/intro/links.html). General philosophical links can be found at [http://philosophy.lander.edu/gen_phil_links.html](http://philosophy.lander.edu/gen_phil_links.html).

H.3 Periodicals in Philosophy

If you find time during the semester to browse in the Larry A. Jackson Library, there are a few journals which show some of the technical applications of philosophy. These include the following publications.

*The American Philosophical Quarterly*

*The British Journal for the Philosophy of Science*

*Ethics*

*International Philosophical Quarterly*

*Mind*
I  Class Assignments

Daily Schedule  Version 1.0

Note: The following assignment schedule is subject to revision and is intended to be a general guide to the assignments this semester. The assignment written on the blackboard at the beginning of each class takes precedence over this schedule. As the semester progresses, for the most recent version of our class schedule, check http://philosophy.lander.edu/scientificreas/assignment.html. If an update is available, the version number will be a number higher than Version 1.0. In the “Date” column, the number after M, W, or F is the number of the class, counting from the beginning of the semester. In the Class Topic column, the subjects covered by that day’s class are listed, together with important due dates for assignments, quizzes, and papers. The Assignment column lists the day an assignment is assigned, not the day the assignment is due.

Assignment Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Class Topic</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.05</td>
<td>Welcome to the Course</td>
<td>Study Syllabus 1-18.</td>
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<tr>
<td></td>
<td>Purpose of the Course</td>
<td>Obtain textbook</td>
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<td></td>
<td>What is Philosophy?</td>
<td>Check out Scientific Reasoning Web</td>
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<td></td>
<td>Class Requirements</td>
<td>Begin Syllabus Web Practice Sheet</td>
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<td>W 1</td>
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<tr>
<td>01.17</td>
<td>The Structure of Arguments</td>
<td>Continue Quiz 1: Web Practice Sheet</td>
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<td></td>
<td>Premisses and Conclusions</td>
<td>Study Copi 1-11; 16-21</td>
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<tr>
<td></td>
<td>Diagramming Simple Arguments</td>
<td>Ex. 12-15: 1, 3, 4, 6, 20, 31</td>
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<td>Ex. 21-23: 2, 3, 7, 12, 17</td>
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<td>Quiz: Argument Indicators</td>
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<td>Quiz: Statements</td>
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<td>01.20</td>
<td>Nonarguments and Explanations</td>
<td>Study Copi 26-31; 37-43</td>
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<td>Diagramming Complex Argu-</td>
<td>Sign up for srhelp</td>
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<td>Post message mwforum</td>
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<td></td>
<td>Quiz: Argument Indicators</td>
<td>Ex. 45-46: 10, 11, 15, 16, 17, 19</td>
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<td>Quiz: Statements</td>
<td>Quiz Diagramming</td>
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<td>M 3</td>
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<td>Date</td>
<td>Class Topic</td>
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<tr>
<td>01.22</td>
<td>Deduction and Induction</td>
<td>Study Copi 50-57; Opt. 57-63 (Opt. especially Pre-Law) Syllabus Ex. Diagramming Opt Quiz: Copi 62: 2, Hats Problem</td>
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<td>W 4</td>
<td>Truth, Validity, and Soundness Quiz: Diagramming</td>
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<td>F 5</td>
<td>Class does not meet</td>
<td>Study Copi 82-89 Syllabus Ex. Emotive Significance Continue Web Practice Sheet</td>
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<td>01.27</td>
<td>Self-Directed Inquiry: Forms of Language</td>
<td>Study Copi 82-89 Syllabus Ex. Emotive Significance Continue Web Practice Sheet</td>
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<tr>
<td>M 6</td>
<td>Class does not meet</td>
<td>Study Copi 85-89 Ex. 91: 10-14 Syllabus Ex. Varieties of Disagreements Varieties of Disagreements</td>
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<tr>
<td>01.29</td>
<td>Self-Directed Inquiry: Emotive Words</td>
<td>Study Copi 92-94 Select Questions for Review Complete Web Practice Sheet</td>
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<td>W 7</td>
<td>Class does not meet</td>
<td>Study Copi 96-98</td>
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<tr>
<td>02.03</td>
<td>Emotive Significance Neutral Language Quiz: Varieties of Disagreements</td>
<td>Review for Test Study Copi 1-95 Chat 02.06 8-9 PM Syllabus: Review for Test I</td>
</tr>
<tr>
<td>M 9</td>
<td>Review of Language</td>
<td>Study Copi 105-110 Ex. 103-105: 1-10 Prepare Fallacy Flash Cards</td>
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<tr>
<td>02.05</td>
<td>Review of Arguments Quiz: Web Practice Sheets Due Student Directed Questions</td>
<td>Study Copi 105-110 Ex. 103-105: 1-10 Prepare Fallacy Flash Cards</td>
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<tr>
<td>W 10</td>
<td>Test 1: Arguments and Language</td>
<td>Study Copi 105-110 Ex. 103-105: 1-10 Prepare Fallacy Flash Cards</td>
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<td>F 11</td>
<td>Nature of Fallacies Classification of Fallacies Equivocation: Begging the Question Complex Question: False Dichotomy</td>
<td>Study Copi 105-110 Ex. 103-105: 1-10 Prepare Fallacy Flash Cards</td>
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<td>Date</td>
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<td>02.12</td>
<td>Red Herring; Straw Man</td>
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<td>Division; Composition</td>
<td>Ex. 110-111: 1-10</td>
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<td>Prepare Fallacy Flash Cards</td>
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<td>Quiz: Fallacy, Part I</td>
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<td>02.14</td>
<td>Fallacies of Relevance</td>
<td>Study Copi 111-120</td>
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<td>Popular Appeal; Appeal to Authority</td>
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<td>Appeal to Ignorance; Appeal to Emotion</td>
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<td>Personal Attack</td>
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<td>Quiz: Fallacy, Part I</td>
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<td>02.17</td>
<td>Inductive Fallacies</td>
<td>Study Copi 132-137</td>
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<td>Genetic Fallacy; Hasty Generalization</td>
<td>Ex. 127-129: 1-10</td>
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<td>False Cause; Slippery Slope</td>
<td>Ex. 129-131: 1-20</td>
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<td>Purposes of Definition</td>
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<td>Types of Definition</td>
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<td>Quiz: Fallacy, Part II</td>
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<td>02.21</td>
<td>Kinds of Meaning</td>
<td>Study Copi 144-154</td>
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<td>Techniques For Defining</td>
<td>Ex. 148: I: 1-5</td>
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<td>Quiz: Types of Definitions</td>
<td>Quiz: Types of Definitions</td>
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<td>Rules for Definition by Genus and Difference</td>
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<td>Quiz: Types of Definitions</td>
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<td>Ex. 160-161: III:1-10</td>
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<td>Choose Paper or Project Topic</td>
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<td>Review of Fallacies</td>
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<td>Review of Definition</td>
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<td>Chat 02.27 8-9 PM</td>
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<td>Syllabus Review Sheet</td>
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<td>Test II</td>
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<td>02.28</td>
<td>Test II: Fallacies and Definitions</td>
<td>Study Copi 163-167</td>
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<td>Complete First Draft of Paper or Project</td>
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<td>03.03</td>
<td>Analogy</td>
<td>Study Copi 163-167</td>
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<td>Analogical Arguments</td>
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<td>Literary Analogies</td>
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<td>03.05</td>
<td>Evaluating Analogical Arguments</td>
<td>Study Copi 171-176</td>
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<td><em>Quiz:</em> Analogical Schema</td>
<td>Ex. 176-178: 1-5 Begin</td>
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<td><em>Quiz:</em> Paper or Project</td>
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<td>03.07</td>
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<td>F 23</td>
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<td>Ex. 175-178: 1-5 Complete</td>
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<td>03.14</td>
<td>Causal Connections</td>
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<td>03.17</td>
<td>Necessary and Sufficient Conditions</td>
<td>Ex. 194 all</td>
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<td>M 24</td>
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<td><em>Quiz:</em> Necessary and Sufficient Conditions</td>
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<td>03.19</td>
<td>Mill’s Methods of Experimental Inquiry</td>
<td>Study Copi 194-198; 200-203</td>
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<td>W 25</td>
<td>Method of Agreement</td>
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<td><em>Quiz:</em> Necessary and Sufficient Conditions</td>
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<td>03.21</td>
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<td>Study Copi 204-209</td>
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<td>F 26</td>
<td>Joint Method of Agreement and Difference</td>
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<td><em>Quiz:</em> Method of Agreement</td>
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<td>03.24</td>
<td>Mill’s Methods</td>
<td>Study Copi 211-213; 215-218</td>
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<td>M 27</td>
<td>Method of Residues</td>
<td>Ex. 213-214: 2, 5</td>
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<td>Method of Concomitant Variations</td>
<td>Ex. 218: 3</td>
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<td></td>
<td><em>Quiz:</em> Method of Agreement</td>
<td><em>Quiz:</em> Method of Difference</td>
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<td>03.26</td>
<td>Review of Analogy and Mill’s Methods</td>
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<td>W 29</td>
<td><em>Quiz:</em> Method of Difference</td>
<td>Bring Questions to Class</td>
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<tr>
<td>03.28</td>
<td>Mill’s Methods and Modern Science</td>
<td>Review Copi 163-226</td>
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<td>F 29</td>
<td>Review of Analogy and Mill’s Methods</td>
<td>Syllabus: Review Test III</td>
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<td>Student Directed Questions</td>
<td>Chat 03.30 8-9 PM</td>
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<tr>
<td>03.31</td>
<td><em>Test III</em>: Analogical Arguments and Mill’s Methods</td>
<td>Study Copi 235-238</td>
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<td>M 30</td>
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<td>04.02</td>
<td><em>Science and Value Theory</em></td>
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<td><em>Kinds of Explanations</em></td>
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<td><em>Evaluating Scientific Explanations</em></td>
<td>Study Copi 244-249</td>
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<td>F 32</td>
<td><em>Relevance; Compatibility</em></td>
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<td><em>Predictive or Explanatory Power</em></td>
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<td><em>Simplicity</em></td>
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<td>04.07</td>
<td><em>The Detective as Scientist, Part I</em></td>
<td>Study Copi 249-257</td>
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<td>Begin British Mystery</td>
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<td>04.09</td>
<td><em>The Detective as Scientist, Part II</em></td>
<td>Re-Study Copi 249-257</td>
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<td>04.11</td>
<td><em>The Pattern of Scientific Investigation</em></td>
<td>Study Copi 257-261</td>
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<td><em>Quiz</em>: Email Pattern Inquiry Completed</td>
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<td>04.14</td>
<td><em>Crucial Experiments and ad hoc Hypotheses</em></td>
<td>Study Copi 261-266</td>
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<td>04.16</td>
<td><em>Can There Be a Logic of Discovery?</em></td>
<td>Ex. 271-281: 3, 5, 6, 8, 9</td>
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<td><em>Problem Solving</em></td>
<td><em>Quiz</em>: Complete Comments on Papers</td>
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<td>Study Copi 267-270</td>
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<td>F 38</td>
<td><em>Taxonomy and Event Description</em></td>
<td>Ex. 271-281: 13, 23, 26</td>
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<td><em>Quiz</em>: Comments on Papers Due</td>
<td>Bring Review Questions to Class</td>
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<td><em>Review For Science and Hypothesis</em></td>
<td>Review Copi 235-271</td>
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<td>M 39</td>
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<td>Review For Test IV</td>
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<td>Test IV</td>
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<td>Chat 04:22 8-9 PM</td>
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<td>04.23</td>
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<td>W 40</td>
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<td>04.25</td>
<td><em>Review For Final</em></td>
<td>Review Questions For</td>
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<td>F 41</td>
<td><em>Arguments; Language</em></td>
<td>Tests II-IV</td>
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<td><em>Fallacies; Definitions</em></td>
<td>Web: Scientific Reasoning</td>
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<td><em>Student Directed Questions</em></td>
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<tr>
<td>Date</td>
<td>Class Topic</td>
<td>Assignment</td>
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<td>04.28</td>
<td>Review For Final</td>
<td>Review for Selected Exams</td>
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<td></td>
<td>Analogy; Mill's Methods</td>
<td><em>q.v.</em>, FAQ</td>
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<td>Science and Hypothesis</td>
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</tr>
<tr>
<td>04.07</td>
<td>Final Examination</td>
<td>Grades Posted within 48</td>
</tr>
<tr>
<td>W</td>
<td>MWF 8:00-11:00 AM Section 01</td>
<td>hours</td>
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</table>
How to Calculate Your Semester Grade

The worksheet below is designed to clarify the manner in which your grade in this course is calculated.

**Course Grade Worksheet**

<table>
<thead>
<tr>
<th>Class Tests</th>
<th>Final Tests</th>
<th>Test Ave</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Test 1</td>
<td>Test 1</td>
<td></td>
</tr>
<tr>
<td>B Test 2</td>
<td>Test 2</td>
<td></td>
</tr>
<tr>
<td>C Test 3</td>
<td>Test 3</td>
<td></td>
</tr>
<tr>
<td>D Test 4</td>
<td>Test 4</td>
<td></td>
</tr>
</tbody>
</table>

**Quizzes**

1. Web Practice
2. Paper or Translation
3. mwforum Comment
4. Quiz
5. Quiz
6. Quiz
7. Quiz
8. Quiz
9. Quiz
10. Quiz
Quiz Total

**E Quiz Ave.**

**Semester Average**

A–E

**Legend for Worksheet**

**Class Tests** are given during the regular semester.

- Test 1 is “Arguments and Language.”
- Test 2 is “Fallacies and Definition”
- Test 3 is “Analogical Arguments and Mill’s Methods”
- Test 4 is “Science and Hypothesis”

**Final Tests** are offered at the time of the Final Exam. If you are satisfied with your grade on each Class Test, you can exempt the Final Exam. If you...
wish to try to improve your grade on any or all of the regular semester
tests, you may take any or all of the Final Tests. If you do take a Final
Test, your test grade for that subject is the average of the Class Test and
the Final Test even though your grade on the Final Test might be lower
than your grade on the Class Test. If you have provided a written excused
absence for a Class Test, you may take the Final Test in that subject as a
“make-up” test, and that grade is used in the calculation for the Semester
Grade Average.

Quiz grades are drawn from class assignments: homework, paper, discussion
list, message boards, and in-class quizzes.

- **Web Practice** is the homework “Web Practice Worksheet” in the
Appendix to this syllabus.
- **srhelp Discussion List** (optional) is the grade determined by your
email posts to the Majordomo Discussion List. Each of your messages
 appearing in the srhelp Archives counts two points for a maximum quiz grade of ten points. Your messages on the srhelp Archives are
at http://philosophy.lander.edu/srhelp.archive/.
- **mwforum Discussion Message Board** (optional) is the grade de-
termined by your posts to the mwforum Philosophy Discussion Board.
Each message counts two points for a maximum quiz grade of ten
points. You can find the number of messages you have posted by
logging in to the Message Board and first click the link “options” at
the top of the page and then the link “Info” on the same line as your
username. Under “statistics” on that page, you will see the total
number of posts for all Message Boards.
- **Paper or Translation** is the grade determined by your Commen-
tary, Position Paper, or Translation (Modern Language Option) which
was posted to the mwforum Philosophy Papers Message Board, as
described in the Appendix.
- **mwforum Comments on the Paper Message Board** is the grade
determined by the number of comments you have posted to the pa-
pers uploaded by other students in the class.
- **Quizzes** are the grades determined by homework and in-class quizzes.
Only the highest remaining quiz grades are counted toward your final
average.

**Quiz Average** is determined by adding the three required quiz scores to the
highest other seven quiz scores and dividing by ten.

**Semester Average** is determined by adding the Class Tests or Test Aver-
ages and the Quiz Average (i.e., A-D, above) and dividing by five. Your
grade for the course is based upon this average in accordance with the
 corresponding letter grade in the table given above under the heading of
“Grades” in “Class Policies” in this Syllabus.
### Types of Questions

<table>
<thead>
<tr>
<th>Email</th>
<th>srhelp</th>
<th>mwforum</th>
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</thead>
<tbody>
<tr>
<td>personal questions</td>
<td>illnesses</td>
<td>field trips</td>
</tr>
<tr>
<td>non-philosophy questions</td>
<td>minor program</td>
<td>private information</td>
</tr>
<tr>
<td>family emergency</td>
<td>make appointment</td>
<td>disability</td>
</tr>
<tr>
<td>email</td>
<td><a href="mailto:larchie@philosophy.lander.edu">larchie@philosophy.lander.edu</a></td>
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<table>
<thead>
<tr>
<th>Types of Questions</th>
<th>Discussion Message Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>daily class activities</td>
<td>help with policies, homework</td>
</tr>
<tr>
<td>getting passwords to work</td>
<td>confirming my own posts to srhelp</td>
</tr>
<tr>
<td>finding if a quiz is assigned</td>
<td>asking about the absence policy</td>
</tr>
<tr>
<td>finding a paper topic</td>
<td>finding a tutor</td>
</tr>
<tr>
<td>working homework problems</td>
<td>finding a Spanish source</td>
</tr>
<tr>
<td>post on the mwforum</td>
<td>Discussion Message Board</td>
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<tr>
<th>Types of Questions</th>
<th>Discussion List</th>
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<tbody>
<tr>
<td>questions beyond the classroom, including ...</td>
<td>questions of interest to non-students</td>
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<tr>
<td>philosophy readings</td>
<td>help with understanding philosophy</td>
</tr>
<tr>
<td>pre-evaluation of papers</td>
<td>meaning of philosophical terms</td>
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<tr>
<td>explanation of how to do problems</td>
<td>why-questions about key concepts</td>
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<tr>
<td>applications of philosophy</td>
<td>examples of arguments</td>
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<td>subject-matter of philosophy</td>
<td>theoretical questions</td>
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<tr>
<td>email srhelp</td>
<td>Discussion List</td>
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