

**School of Psychology
Birkbeck College
University of London**

**BSc Psychology
PSYC044U Psychobiology II**

COURSE HANDBOOK

Session 2006-2007

Date Printed: 24-01-07

BSc Psychology
PSYC044U Psychobiology II
COURSE HANDBOOK 2006-2007

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GENERAL INFORMATION

Contacts

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Description

Psychobiology II is a 0.5 unit course taught on Thursday evenings of the Spring and Summer terms. The course is examined by one 2 hour written paper taken late in Summer term. The time and date of this examination will be announced during Spring term. The course is normally completed in the second year of a 4-year B.Sc programme.

COURSE AIMS AND OBJECTIVES

Course Aims

The general aims of the course are:

- *to revise material from earlier courses on psychobiology of the central nervous system and to review evolutionary explanations of behaviour*
- *to examine the interaction between innate and acquired knowledge in animal behaviour*
- *to provide an introduction to basic learning paradigms and their biological functions*
- *to survey incentive-based and anxiety-based motivation, and animal and computational models for perception and memory*

Course Objectives

At the end of this course you should be able to:

- *give an account of the psychobiology of the central nervous system and of evolutionary explanations of behaviour*
- *describe and critically evaluate interactions between innate and acquired knowledge in animal behaviour*
- *identify and accurately describe basic learning paradigms and their biological functions*
- *specify the main concepts and theories covered in each of the lecture topics and the phenomena on which they are based*
- *write an essay on a selection from the essay titles provided on page 7 of this handout.*

Course PSYC044U (2nd Yr) (PSYCHOBIOLOGY II)

LECTURE PROGRAMME, 2007

Lectures are on Thursday evenings in room B33, Main Building

DATE	WEEK	LECTURE TOPICS
Jan 25th	1	Innate and acquired mechanisms of cognition: empiricist theories (associative learning theory, connectionism) versus nativist (ethology, sociobiology) theories.
Feb 1st	2	Neonatal instinctive behaviours and early learning in development: imprinting, maternal deprivation in non-human primates.
Feb 8 th	3	General learning processes: Habituation and Pavlovian (classical) conditioning.
Feb 15th	4	Reading week (no lectures)
Feb 23rd	5	Levels of representation in Pavlovian conditioning; Pavlovian like processes in human subjects.
March 1st	6	Instrumental conditioning (operant or goal directed learning). Biological constraints on learning; comparisons of classical and instrumental conditioning
March 8th	7	Motivating effects of aversive stimuli: conditioned anxiety in animal avoidance learning and human neuroses.
March 15th	8	Perceptual processes: generalization and attention in discrimination learning, pattern recognition and categorization.
March 22nd	9	Processes of animal memory: experimental analyses and anatomical and ecological theories.
April 25th	10	Higher cognitive processes in non-human primates and other species: attempts at "language" training.
May 3rd	11	Higher cognitive processes: spatial knowledge and reasoning.
May 10th	12	Comparisons between experimental analyses of learning and connectionist (neural network) simulations.
May 17th	13	Further comparisons between human, animal and machine learning. Course Review.

BOOK LIST AND HANDOUTS

Book List

There is no single textbook that covers all the material referred to in lectures. Recent texts which cover some of lecture material include Pearce (1997) and Lieberman (1990; 2nd Edition 1993; 3rd Edition 2000). **Lieberman (2000)** is the closest text available in bookshops. About two-thirds of the course material is covered in my *Animal Learning* (1987) which is no longer in print, but which is still available in Birkbeck's library and on the intranet. There will be additional content not in the standard texts especially at the beginning and end of the course, and **course handouts** will include references to more recent material. A more introductory treatment of some topics is given in the first five chapters of *Learning Theory and Behaviour Modification* (1984) which is also available in Birkbeck and other libraries, but is not available for purchase.

Main textbooks (partly overlapping: SLC=short loan collection)

Lieberman, D. (1990, 1993, or 2000) *Learning: Behavior and Cognition. 1st, 2nd and 3rd Editions.* Belmont: Wadsworth. (for the 2000 edition, 2x1wk loan and 3x3wk loan at BK; two copies available at UCL -Bloomsbury Science Library - at G 50 Lie and one at Senate House, 67 IFI/Lie).

Walker, S.F. (1987) *Animal Learning: An Introduction.* Routledge & Kegan Paul: London. (Short Loan: 4 copies altogether, at IAV [Wal])

Other source books

Davey, G. (1989) *Ecological Learning Theory.* London: Routledge. (1 short loan at BK; 1 reference at Senate House; 1 at UCL)

Mackintosh, N.J. (1983) *Conditioning and Associative Learning.* Clarendon Press: Oxford. (1xShort Loan IAW [Mac])

Pearce (1997) *Animal Learning and Cognition* 2nd Edition. Hove: Psychology Press. 156.315 PEA in new section at Birkbeck. 3 normal and 2 Short Loan copies.

Roberts, W.A (1998) *Principles of Animal Cognition.* Boston: McGraw-Hill. (2x 3wk loan, 2x1wk loan, 1 SLC)

Walker, S.F. (1983/1985) *Animal Thought.* Routledge & Kegan Paul: London. (2SLC +3x 3wk BK)

Walker, S.F. (1984) *Learning Theory and Behaviour Modification.* Methuen: London. (1SLC, 1x1wk, 3x 3wk)

Handouts

Handouts will be distributed to go with the lectures which will normally contain brief notes on the lectures topics, and copies of selected overheads. Bibliographic references will be separated into **Main Sources**, usually sections from the books above, **Further Reading**, which will indicate possibilities for more extended additional reading, and **Other References**, which are included to give an idea of the nature and location of primary sources, but which you are not intended to have to read. The basic notes and references from the 2006 handouts week by week are *available on the Departmental Intranet (via WebCT)*, and the same material for 2007 will be added from time to time this session.

Examination

Two questions will need to be answered out of six set. The paper was called P207, rather than PSYC044U from 1994 to 2004. The title was previously "Adaptive Learning and Comparative Cognition"

GATHERING INFORMATION

The College Library

By this stage in the course you should not need an introduction to the library. You should know where the short loan collection is, and the rules for using it (4 hour loans).

The recommended reading is mainly from textbooks (see page 5 above) and it is rarely necessary for students to consult original journal articles in great detail.

Those who wish to delve more deeply into some of the subject areas can do so using the same tools that are useful in other areas of psychology, such as PsycInfo (formerly known as PsycLit) available via BIDS on the internet, or internet access to databases such as the Web of Science.

PsycInfo is a valuable research tool. It can be accessed from PCs in the College or from other PCs if you log-on first.. Usually a key word or collection of words will provide up to date references on a topic. If you cannot use PsycInfo yet then ask for further information in the library or from Dr Biringen-Akman.

The Web of Science provides access to the Science Citation Indices, across all subject areas, and may be useful for the more psychobiological aspects the course. It is listed under Electronic Data Bases on the Birkbeck Library Web pages. It is under “Web of Knowledge”. The url is at <http://tinyurl.com/29hno5>

School intranet

[For more detail see the School Computing Handbook]. Basic information about the course can be found on the School’s **intranet** pages. These pages contain the course programme, reading lists, outlines of some lectures, and past exam papers.

To access the intranet from the School PC’s in 534 and 503:

- i. log on with your personal username and password.
- ii) Log on to WebCT (<http://tinyurl.com/yyktan>) and select Psychbiology II. Then select ‘Lecture programme’ and then ‘2007 programme’ or “2006 lectures” for last year’s handouts (you can click on the week number to find lecture notes and reading lists for that week).
- iii) Alternatively, for a limited period of time this session, you can go directly to the 2007 lecture programme at <http://tinyurl.com/y39r84>, using the same username and password needed for the School intranet last session (ask the lecturer if you have forgotten this.)

The internet and World Wide Web more generally

Birkbeck Library has links to ways of searching the Web if you follow the links to “Internet Resources”, then “Searching the Internet” (at <http://www.bbk.ac.uk/lib/elib/internet>)

Do not print out material unless you really need to and it is properly edited to use the least amount of paper. (Remember, much of the information on the WWW is not subject to scrutiny or peer review so be cautious in your use of it: there are many academically unreliable sites on animal cognition.)

WRITING ESSAYS

A good way to consolidate and extend your knowledge, and prepare for the examination is to write essays. Essays will be returned with a mark and comments, normally within two weeks. We will keep a record of essays submitted and marks, and may retain a copy of your essay and the marksheet for quality assurance purposes.

Essays should either address topics given out during the lectures or questions from recent examinations. The following questions come from the 2005 and 2006 examinations.

Sample Essay Topics (2005 Examination)

1. Consider, making use of examples, whether learning and instinct ought to be regarded as mutually exclusive types of explanation for animal behaviours.
2. To what extent can the phenomena of Pavlovian conditioning be explained by a single universal principle of association?
3. 'Emotional learning that is best accounted for by conditioning principles plays a role in both the causes of, and the cures for, human anxiety disorders.' Discuss.
4. Evaluate the evidence for episodic-like memory processes in animal behaviour.
5. Chimpanzees are said to be our closest living relatives. Evaluate the extent to which experimental evidence supports the case that this is reflected in their cognitive processes.
6. Compare and contrast the kinds of learning observed in animals and the learning rules adopted in connectionist models of human cognition.

Sample Essay Topics (2006 Examination)

1. Discuss the role of instinctive and learned factors EITHER (a) in "imprinting" in birds OR (b) in the development of early social attachments in primates.
2. Evaluate the evidence for Pavlovian conditioning in human behaviour.
3. Consider the evidence for memory processes in non-human species, including that relating to the role of the hippocampus.
4. Consider whether the evidence for Tolmanian "cognitive maps" is compatible with Thorndike's "Law of Effect".
5. "There are neither quantitative nor qualitative differences among the intellects of non-human vertebrates." Discuss with reference to experimental evidence concerning cognitive processes in chimpanzees.
6. Critics of connectionist modelling of human cognition often claim that it shares many features with behaviourist "stimulus-response" theories of learning. To what extent is this comparison just?

ASSESSMENT

The Written Examination

The course will be assessed by one written examination held in late May or early June. This will be a two hour examination in which you will be required to answer two questions from a selection of six.

Self-Appraisal

There are several different ways to monitor how you're doing on the course, such as checking that you have reached the objectives after each lecture on the course or regularly reflecting on your own progress on the course. One way that may help you chart your progress on the course is filling in the following Self-Appraisal Form.

Rate yourself from 1 "could-do-better" to 5 "couldn't-do-more" on the following points:

- | | | | | | |
|---|---|---|---|---|---|
| • Attendance at lectures | 1 | 2 | 3 | 4 | 5 |
| • Taking notes to supplement lecture handouts | 1 | 2 | 3 | 4 | 5 |
| • Borrowing books from the library | 1 | 2 | 3 | 4 | 5 |
| • Reading the books I have borrowed from the library! | 1 | 2 | 3 | 4 | 5 |
| • Writing essays (general appraisal) | 1 | 2 | 3 | 4 | 5 |

On essays written I am satisfied with:

- | | | | | | |
|--|---|---|---|---|---|
| • Structure | 1 | 2 | 3 | 4 | 5 |
| • Content | 1 | 2 | 3 | 4 | 5 |
| • Learning from feedback | 1 | 2 | 3 | 4 | 5 |
| • Knowledge of main themes so far in
Psychobiology II | 1 | 2 | 3 | 4 | 5 |

Specify the particular highs, lows, and future goals:

What has gone well on the course so far?

What do I need to catch up on?

What are my future goals on the course?

BRIEF AIMS AND OBJECTIVES FOR EACH WEEK OF THE COURSE

WEEK 1

Aims: *These two lectures aim -*

- *to introduce students to the whole programme of lectures and to the recommended texts and source books*
- *to outline the contrast between experimental studies of animal learning and nativist approaches to animal behaviour.*

Objectives: *By the end of the lectures the students should:*

- *be able to identify the main textbooks and source books and the location of the programme of lectures in the course handbook*
- *understand some of the key differences between empiricist and nativist approaches to animal behaviour*
- *be able to specify the main features of the ethological and sociobiological approaches to animal behaviour*

WEEK 2

Aims: *These two lectures aim -*

- *to review the interaction of instinct and learning in the context of neonatal and parental behaviour especially in birds and primates*

Objectives: *By the end of the lectures the students should:*

- *be familiar with the main concepts and theoretical issues arising from the study of imprinting and the phenomena on which these are based*
- *know the main features of mother-infant interactions in primates*
- *be able to write an essay on the topic listed in the handout for week 2.*

WEEK 3

Aims: *These two lectures aim -*

- *to outline the basic features of habituation, sensitization and Pavlovian conditioning*

Objectives: *By the end of the lectures the students should:*

- *be conversant with the main phenomena which characterise habituation, sensitization and Pavlovian conditioning and the concepts and theoretical issues which arise from these.*
- *be able to correctly identify what is referred to by the terms 'habituation' 'sensitization', 'conditioned stimulus' and 'unconditioned stimulus'.*
- *be able to write an essay on the topic listed in the handout for week 3.*

WEEK 4

This is reading week and there will be no lectures.

WEEK 5

Aims: These two lectures aim -

- to survey Pavlovian (Classical) conditioning phenomena in a wide variety of contexts including the use of Pavlovian procedures with human subjects.

Objectives: By the end of the lectures the students should:

- be acquainted with variations in the phenomena produced by Pavlovian procedures use in a variety of contexts, including phenomena observed when Pavlovian procedures are used with human subjects.
- be able to specify the main theoretical issues arising from these variations.
- be able to write an essay on the topic listed in the handout for week 4.

WEEK 6

Aims: These two lectures aim -

- to review the main concepts and theories associated with instrumental learning (operant conditioning) and the phenomena on which these are based
- to compare and contrast aspects of instrumental learning and classical conditioning and discuss their relation to the biological function of these basic learning paradigms.

Objectives: By the end of the lectures the students should:

- be able to identify and distinguish the basic learning paradigms of instrumental learning and classical conditioning and discuss their biological functions
- be able to specify the main areas similarities and differences in comparisons of instrumental learning and Pavlovian conditioning
- be prepared to write an essay on the topic listed in the handout for week 5.

WEEK 7

Aims: These two lectures aim -

- to outline the two-process theory of animal avoidance learning and to examine historical and theoretical relationships between the concept of conditioned anxiety and the development of behavioural theories of the origin and treatment of human neurotic syndromes

Objectives: By the end of the lectures the students should:

- be familiar with the main concepts and theoretical issues arising from the study of animal avoidance learning and the phenomena on which these are based
- be conversant with the historical and theoretical relationships between the concept of conditioned anxiety and the development of behavioural theories of the origin and treatment of human neurotic syndromes
- be able to write an essay on the topic listed in the handout for week 7.

WEEK 8

Aims: These two lectures aim -

- to survey experimental evidence for processes of attention and perceptual complexity in animal discrimination learning

Objectives: By the end of the lectures the students should:

- be acquainted with experimental evidence for process of attention and perceptual complexity in animal discrimination learning, especially in the context of visual discriminations
- be informed of experimental evidence concerning pattern recognition of non-natural stimuli produced by discrimination learning procedures
- be prepared to write an essay on the topic listed in the handout for week 8

WEEK 9

Aims: *These two lectures aim -*

- *to review experimental evidence for process of working memory revealed by experiments in animal learning*

Objectives: *By the end of the lectures the students should:*

- *be informed of the experimental evidence for processes of working memory revealed in animal learning experiments, particularly in studies using the radial maze, and those investigating cache recovery by food-storing birds*
- *be aware of theoretical issues surrounding the role of the hippocampus in the control of animal behaviour*
- *be prepared to write an essay on the topic listed in the handout for week 9*

WEEK 10

Aims: *These two lectures aim -*

- *to outline general issues surrounding the question of primate intelligence*
- *to describe and evaluate experimental evidence arising from attempts to train chimpanzees in methods of language-like communication such as American Sign Language*

Objectives: *By the end of the lectures the students should:*

- *be conversant with the general issues surrounding the question of primate intelligence*
- *be prepared to assess the evidence arising from attempts to train chimpanzees in methods of language-like communication such as American Sign Language*
- *be prepared to write an essay on the topic listed in the handout for week 10*

WEEK 11

Aims: *These two lectures aim -*

- *to survey evidence for primate intelligence in the areas of Piagetian testing for knowledge of the properties of objects and spatial relationships between them, social knowledge, and elementary forms of reasoning.*

Objectives: *By the end of the lectures the students should:*

- *be acquainted with evidence for primate intelligence in the areas of Piagetian testing for knowledge of the properties of objects and spatial relationships between them*
- *be prepared to assess the evidence for social knowledge such as that revealed by successful self-recognition and imitation learning, and elementary forms of reasoning.*
- *be able to write an essay on the topic listed in the handout for week 11*

WEEK 12

Aims: *These two lectures aim -*

- *to examine similarities and differences arising from comparisons of associationist theories of animal learning and theories of learning in simulated neural networks*

Objectives: *By the end of the lectures the students should:*

- *be acquainted with the most basic features of how the process of learning is used in connectionist theories of the operation of simulated neural networks*
- *be aware of the strengths and weakness of neural network simulations of human cognition and associationist learning theory accounts of human cognition*
- *be prepared to write an essay on the topic listed in the handout for week 12*

WEEK 13

Aims: *These two lectures aim -*

- *to examine examples of cultural and educational approaches to specifically human forms of learning and to contrast these with approaches based on animal learning theories and connectionist theories of human cognition*
- *to briefly review the lectures given throughout the course programme*

Objectives: *By the end of the lectures the students should:*

- *be informed of examples of cultural and educational approaches to specifically human forms of learning and be prepared to contrast these with approaches based on animal learning theories and connectionist theories of human cognition*
- *be prepared to write an essay on the topic listed in the handout for week 13*
- *be reminded of the scope and content of the lectures given in all the previous weeks of the course.*