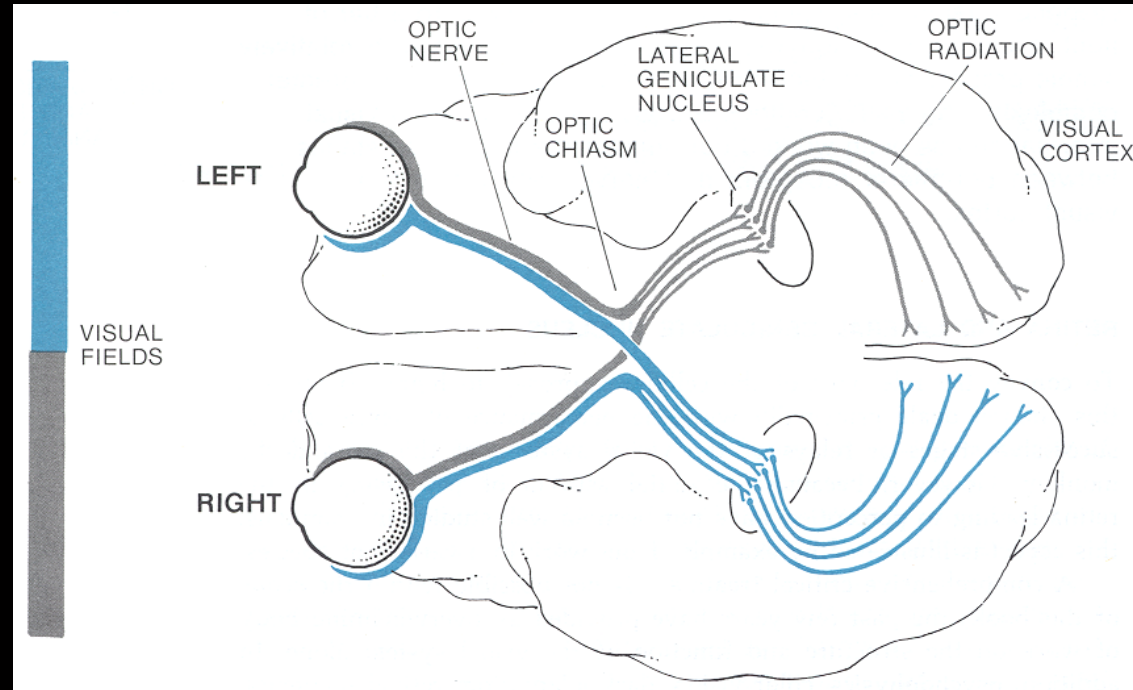


# NEUR0017/G017/M017: Visual Neuroscience

Course  
Information  
2020



Andrew Stockman

# Course summary

## NEUR3045/G045/M045 Visual Neuroscience

This half-unit course presents a multidisciplinary approach to vision. It will cover anatomical, physiological, genetic, molecular and psychological approaches. The course covers the fundamentals of visual neuroscience from the visual input at the retina to visual perception. The topics range from retinal imaging, visual transduction, the functional anatomy of the retina and LGN, cortical processing to higher level visual functions, such as colour, depth, space, and motion perception.

Course  
organiser

NEUR0017/G017/M017  
Visual Neuroscience

Andrew Stockman  
UCL Institute of Ophthalmology  
11-43 Bath Street  
London  
EC1V 9EL

Phone: 020 7608 6914  
email: [a.stockman@ucl.ac.uk](mailto:a.stockman@ucl.ac.uk) (best contact  
method)

See: <http://www.cvrl.org> for course information,  
essay titles, seminar titles, old exam questions, etc.  
[CLICK ON NEUR0017 LINK]

# Course lecturers

## NEUR0017/G017/M017 Visual Neuroscience

Tessa Dekker (Ophthalmology) [t.dekker@ucl.ac.uk](mailto:t.dekker@ucl.ac.uk)

Adam Dubis (Ophthalmology) [a.dubis@ucl.ac.uk](mailto:a.dubis@ucl.ac.uk)

John Greenwood (Psychology) [john.greenwood@ucl.ac.uk](mailto:john.greenwood@ucl.ac.uk)

Peter Jones (Ophthalmology) [p.r.jones@ucl.ac.uk](mailto:p.r.jones@ucl.ac.uk)

Andrew Rider (Ophthalmology) [a.rider@ucl.ac.uk](mailto:a.rider@ucl.ac.uk)

Stewart Shipp (Ophthalmology) [s.shipp@ucl.ac.uk](mailto:s.shipp@ucl.ac.uk)

Andrew Stockman (Ophthalmology) [a.stockman@ucl.ac.uk](mailto:a.stockman@ucl.ac.uk)

# Course timetable 2020

BLOCK G: 2-6 pm.

IOE - John Adams Hall G25

Check locations on the UCL  
Common Timetable.

Visual Neuroscience

|                     |              |  |
|---------------------|--------------|--|
| <b>Week 21</b>      |              |  |
| Tuesday             | 14th Jan 2-3 | 1. Introduction. (AS).                                     |
| Tuesday             | 14th Jan 3-4 | 2. Physiological optics and the photoreceptor mosaic. (AD) |
| Tuesday             | 14th Jan 4-5 | 3. Photoreceptors and phototransduction. (AS)              |
| <b>Week 22</b>      |              |  |
| Tuesday             | 21st Jan 2-3 | 4. Introduction to the retina. (AS)                        |
| Tuesday             | 21st Jan 3-4 | 5. Achromatic & chromatic vision. (AS)                     |
| Tuesday             | 21st Jan 4-5 | 6. Fundamentals of psychophysics. (PJ)                     |
| <b>Week 23</b>      |              |  |
| Tuesday             | 28th Jan 2-3 | 7. Visual psychophysics and sensitivity regulation. (AR)   |
| Tuesday             | 28th Jan 3-4 | 8. Advanced Retina. (AS)                                   |
| Tuesday             | 28th Jan 4-6 | <b>Demo.</b> Colour vision demonstrations (SS).            |
| <b>Week 24</b>      |              |  |
| Tuesday             | 4th Feb 2-3  | 9. Spatial vision. (JG)                                    |
| Tuesday             | 4th Feb 3-4  | 10. Motion. (AR)   |
| Tuesday             | 4th Feb 4-5  | 11. Single cell function (AD)                              |
| Tuesday             | 4th Feb 5-6  | <b>Tutorial:</b> Questions and answer session (AR/AD)      |
| <b>Week 25</b>      |              |  |
| Tuesday             | 11th Feb 2-3 | 12. Depth perception/Visual Illusions. (AS)                |
| Tuesday             | 11th Feb 3-4 | 13. Central visual pathways (SS)                           |
| Tuesday             | 11th Feb 4-5 | 14. Multiple visual areas of cortex. (SS)                  |
| Tuesday             | 11th Feb 4-5 | <b>Tutorial:</b> Question and answer session. (AS/SS)      |
| <b>Week 26</b>      |              |  |
| <b>READING WEEK</b> |              |  |
| <b>Week 27</b>      |              |  |
| Tuesday             | 25th Feb 2-3 | 15. Hierarchical visual processing. (SS)                   |
| Tuesday             | 25th Feb 3-4 | 16. The neural correlate of consciousness. (SS).           |
| Tuesday             | 25th Feb 4-5 | 17. Foveal versus peripheral vision (JG).                  |
| Tuesday             | 25th Feb 5-6 | <b>Tutorial:</b> Question and answer session (SS/JG)       |
| <b>Week 28</b>      |              |  |
| Tuesday             | 3rd Mar 2-3  | 18. fMRI and visual brain function. (TD)                   |
| Tuesday             | 3rd Mar 3-6  | <b>Seminar 1.</b> Session 1.                               |
| <b>Week 29</b>      |              |  |
| Tuesday             | 10th Mar 2-3 | 19. Visual development in babies and infants. (PJ)         |
| Tuesday             | 10th Mar 3-6 | <b>Seminar 2.</b> Session 2.                               |
| <b>Week 30</b>      |              |  |
| Tuesday             | 17th Mar 2-3 | 20. Atypical vision and visual plasticity. (TD)            |
| Tuesday             | 17th Mar 3-6 | <b>Seminar 3.</b> Session 3.                               |
| <b>Week 31</b>      |              |  |
| Tuesday             | 24th Mar 2-3 | 21. Revision class   |
| Tuesday             | 24th Mar 3-6 | <b>Seminar 4.</b> Session 4 (if needed).                   |

# Undergraduate course assessment (NEUR0017)

- ▶ Assessment will be based upon a final examination worth 80% and course work worth 20%.
- ▶ The course work will be a 10-minute presentation at one of the seminars (worth 20%). The titles for the seminar presentations will be suggested by the individual seminar organisers and posted on [www.cvrl.org](http://www.cvrl.org), the course website.
- ▶ The final exam will be a 3-hour exam. Candidates must answer a total of three questions. Credit will be given for imaginative and critical discussion of experimental evidence relevant to the question being answered. Use separate answer books for each question.

# Graduate course assessment (NEURG017/M017)

- ▶ Assessment will be based upon a final examination worth 70%, an invigilated essay worth 10%, and a seminar presentation worth 20%.
- ▶ The course work will be a 10-minute seminar presentation given by the student at one of the seminars. The titles for the seminars will be suggested by the seminar organizers and posted on this web site (link above).
- ▶ The final exam will be a 3-hour exam. Candidates must answer a total of three questions. Credit will be given for imaginative and critical discussion of experimental evidence relevant to the question being answered. Use separate answer books for each question.
- ▶ There will be a 90-minute invigilated essay (worth 10%). Students will be assigned two or three research journal articles about two weeks before the essay. An essay question that relates to those research articles will be given to the students at the beginning of the 90-minute essay-writing session. Students may have access to the articles during the session, but otherwise the session will be unseen.

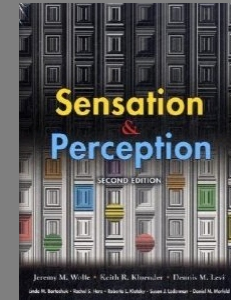
# Course work: seminar presentation

- A single 10 minute oral presentation should be presented by each student at one of the three seminars. The three seminar areas are:
  - (1) Retina
  - (2) Pathways and cortical processing
  - (3) Visual function
- The available seminar titles will be posted on the course website:  
<http://www.cvrl.org>
- Each presentation title will be assigned on a first-come, first-served basis. Send your requests to me by e-mail.
- The timetable and order of presentations will be decided after we know student numbers and choices.

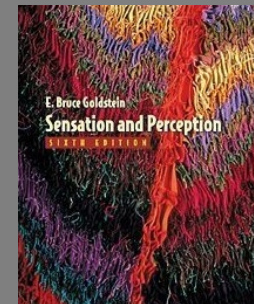


# Recommended Books

Sensation and  
Perception *by* Jeremy M.  
Wolfe *et al.*



Sensation and Perception *by*  
E. Bruce Goldstein

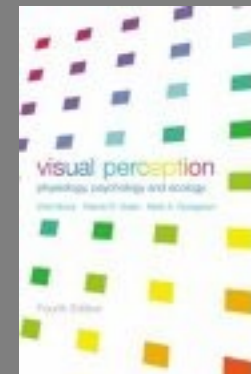


# Recommended books

The First Steps in Seeing  
*by R.W Rodieck*



Visual Perception: Physiology,  
Psychology and Biology *by*  
*Vicki Bruce, Patrick Green and*  
*Mark Georgeson*

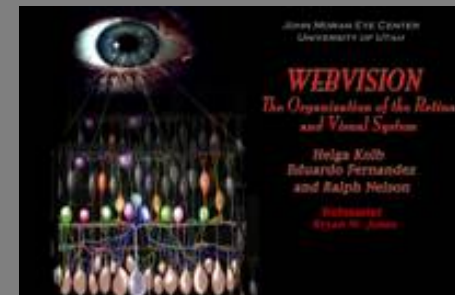


# Recommended reference sources

The Visual Neurosciences by  
*Leo Chalupa and John  
Werner*



Webvision at  
<http://webvision.med.utah.edu/>



*For essays, seminars and background material.*

Course website:

<http://www.cvrl.org>