PS4065: Vision in a complex world

What’s NEW for 2022-2023?

Why study this module?

Your previous studies on sensation and perception will have focused heavily on understanding the psychological and neuroscientific underpinnings of how we use our senses, with emphasis on brain processed and mechanisms. This course is a bit different.

We will study how the perceptual mechanisms that we possess are used to interact with the real world, we’ll cover how and why we are good (or not) at finding camouflaged objects, why some objects rapidly draw our attention, how we use vision to guide ourselves around the real world. We will spend time exploring how culture impacts on our understanding of perception. We will consider how and why most perception research is done in the western world, using western populations, and how this could confine our understanding.

As well as understanding vision is a broader context than you have before, a key aim is to learn how to present ideas and knowledge to a broad audience. Seminar sessions will include learning how to engage the general public via media articles, posts or public engagement, as well as writing persuasively for a specialist audience, for example a research funding panel.

This is a newly developed module, that did not run in 2021-2022, but will run in Semester 2 of the 2022-2023 academic year. **What’s DIFFERENT from the course booklet below (from 21-22) is that the module will be examined 100% by coursework, via two assessments:**

1. A news article or Blog, submitted in the first half of the semester (40%)
2. An outline grant application (60%)

If you have any questions or queries, please feel free to contact me (jh81@st-andrews.ac.uk)

Prof. Julie M Harris
School of Psychology and Neuroscience
# PS4065: Vision in a complex world

**Semester**
Semester 2 2021-22

**Meeting times**
Wednesday 11:00-13:00

**Credits**
15

**Module summary**
The aim of the module is to develop an advanced understanding of the psychological processes involved in visual perception. The module extends basic knowledge of visual processing, from perceptual psychology and visual neuroscience, to how vision is used to interpret our complex world and to interact with it. As well as exploring how we recognise and interpreting the world, and use vision to control our own actions, we will also consider a cultural understanding of perception: who does the science, and what populations do we study?

**Prerequisites & Anti-requisites**
Prerequisites: PS3037

**Assessment**
Coursework 25%, Deadline Monday 28th February, 12 noon (Week 6)
Exam 75%, 2 hours, 2 questions: 1 essay, 1 experiment design

**Staff**
Module Coordinator: Prof. Julie M Harris
Room: 2.53
Email: jh81@st-andrews.ac.uk
Provisional Timetable

<table>
<thead>
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<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Discussion/Activity</th>
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<tr>
<td>1</td>
<td>19/01/22</td>
<td>Introduction; vision in the real world</td>
<td>Q &amp; A</td>
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<td>2</td>
<td>26/01/22</td>
<td>Review of visual perception</td>
<td>Discussion: vision and the real world</td>
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<tr>
<td>3</td>
<td>02/02/22</td>
<td>Finding objects: search and foraging</td>
<td>Effective paper reading</td>
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<tr>
<td>4</td>
<td>09/02/22</td>
<td>Hiding objects: Camouflage</td>
<td>Student led seminar</td>
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<td>5</td>
<td>16/02/22</td>
<td>Objects and material properties</td>
<td>Writing for lay audience</td>
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<td>Spring Vacation week</td>
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<tr>
<td>6</td>
<td>02/03/22</td>
<td>Perception and warning signals</td>
<td>Student led seminar</td>
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<td>7</td>
<td>09/03/22</td>
<td>Perception for controlling locomotion</td>
<td>Student led seminar</td>
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<td>8</td>
<td>16/03/22</td>
<td>Designing an experiment</td>
<td>Group design activity</td>
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<td>9</td>
<td>23/03/22</td>
<td>Vision across different cultures</td>
<td>Design for cross-cultural studies</td>
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<td>10</td>
<td>30/03/22</td>
<td>From past to future: broadening our vision of perception</td>
<td>Inclusion in vision activity</td>
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<td>11</td>
<td>06/04/22</td>
<td>Activity Feedback and Course Revision</td>
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Teaching delivery

The module will consist of a series of lectures and interactive teaching sessions to be held on Wednesday mornings. We currently plan to deliver lectures in-person with live streaming using Microsoft Teams for any students registered as online-only water. Please note that this may be subject to change depending upon the evolution of the Covid pandemic and associated regulations. For in-person classes, physical distancing remains in place and masks are to be worn. The location for in-person sessions will be found on Moodle.

If you are studying remotely, please log on to the PS4065 Teams site and join the scheduled live session online.

SPRING VACATION
There are no teaching sessions scheduled during the week starting Monday 21st February as this is the spring vacation.

Attendance
We will keep note of attendance at all sessions and failure to attend regularly will trigger an academic alert.

Course objectives
- To explore the current literature in the specific vision topics detailed in the timetable and below, which aim to understand how we use vision to interact with the real world.
- To develop an ability to critically analyse scientific papers and to appreciate controversies
surrounding recent developments within the field.

- To engage in the process of good experiment design.
- To develop the ability to present arguments to a variety of audiences, based on the best available scientific evidence.

Course format
The format will include lectures, group session and discussions and student-led seminars. In the seminars, students will be asked to critically evaluate papers to address specific research questions and to debate specific issues using scientific evidence. Each week, the core topics will be covered in a short lecture, followed by a related activity. Students will be expected to study reading material in advance of each seminar session, so that all can participate in the seminar or discussion.

Inclusive curriculum statement
The School is committed to making its teaching and learning fully inclusive, so that all students are given the opportunity to reach their potential, all students feel like they belong and are not made to feel excluded, and students have the opportunity to contribute to curriculum development. If you have any comments or feedback on this module in terms of the inclusivity of the content, delivery or assessments/feedback, please contact the Module Co-ordinator or, if you would rather provide anonymous feedback, please use the Module Evaluation Questionnaire (MEQ). Alternatively, you can contact your School President or Class Representative, who can raise ideas or issues via the relevant staff-student meetings and consultative committees. If you want to report any instances of bullying, harassment or discrimination that have occurred in teaching and learning environments, you can use the University’s Report & Support tool.

Assessment
The course will be assessed via one piece of coursework (25% of module mark), due during the course, and an exam (75% of module mark).

Coursework
25% of the module mark will come from a continuous assessment assignment. This year’s assignment will be to write a summary of a peer-reviewed piece of research, for a lay audience. See Moodle for more details. This assignment should be submitted via MMS by the due date, Monday 28th February, 12 noon. Uploaded assignments should be Word or PowerPoint files rather than PDFs to allow for automatic plagiarism checks. The feedback deadline will be two weeks from the assessment date. If you find that any feedback you receive is unclear, DO contact the marker (whose initials should be on the feedback for just this purpose).

Grade descriptors
For details regarding the ‘Common reporting scale for module grades’ please see: https://www.st-andrews.ac.uk/policy/academic-policies-assessment-examination-and-award-common-reporting-scale/common-reporting-scale.pdf

Submission deadline:
Monday 28th February, 12 noon

Exam
You will be asked to answer two questions in total, one from each of two sections. One section will include essay questions, the other an invitation to construct an experiment design, based on course material and readings.

Lecturer contact
As well as the 2-hour per week time-tabled session (Wednesday 11am-1pm), Prof. Harris will be
available throughout the semester, by appointment, for pre-presentation sessions for presenters of student-led seminars, and to answer individual queries or questions. Please email (jh81) if you would like to make an appointment.

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Course Summary and Reading List

Online list is here:
https://rl.talis.com/3/sta/lists/B5AD41C7-A30F-DBC2-ABFC-EFABE3447AE5.html

Week 1: Introduction: vision in the real world
This week the course will be introduced, including a discussion of the main theories of perception and how they might relate to real world experience.


Sekuler & Blake (2002) Perception. MCGraw Hill, Chapter 1. Introduction to Perception [Copy available to borrow on Internet Archive: https://archive.org/details/perception00seku/mode/2up]

Week 2: Review of visual perception
In this lecture we will review core concepts from vision research that you will need to know to obtain a deep understanding of the later course. We will also review how evidence is used to argue for (or against) specific theories in vision.


Week 3: Finding objects: search and foraging
Most perception courses include sections on visual search, usually described in terms of how the method helps us learn about visual attention. But how do we find things in the real world? In this lecture we will review some of the key evidence from classic methods, and consider how they contribute to our understand of how we find real objects in the real world.
This week there is also a session on skills for reading a vision paper, and how to check that you have really understood what the paper contributes to the literature.

Mather (2016) Foundations of sensation and perception, 3rd edition, Psychology Press. Chapter 14 Attention and perception. [should be available as a scan via your online reading list]


Materials for session on ‘effective paper reading”. Read paper before session.


Week 4: Camouflage: finding deliberately hidden objects

In some real-world situations, objects are deliberately hidden, and in nature, animals have evolved to hide themselves from predators. In this lecture, we will study what strategies provide the best camouflage to evade the visual system and successfully hide objects.

Goldstein (2019) Sensation and Perception. 9th Ed., Brooks-Cole. Chapter 5, Perceiving objects. [should be available as a scan via your online reading list]


Penacchio, O.; Lovell, PG; & Harris, JM (2018) Is countershading camouflage robust to lighting change due to weather? Royal Society Open Science DOI: 10.1098/rsos.170801

Seminar reading


Week 5: Objects and material properties

Our ability to perceive whether something is clean, or dirty, soft or hard, fluffy or spiky, is a crucial part of perception, and a very difficult thing for a visual system to achieve. In this lecture you will be exposed to several ways in which vision researchers are obtain evidence to understand how we perceive the material properties of objects.


Activity: writing for a lay audience

Time magazine: the dress explained. An article aimed at a lay audience explaining how perceptual research can help us understand ‘the dress’.

https://time.com/3725528/dress-explainer-white-gold-blue-black-science/


https://www.eurekalert.org/news-releases/672270
**Associated papers:**
Lafer-Sousa and Hermann et al.: "Striking individual differences in color perception uncovered by 'The Dress' photograph" [http://dx.doi.org/10.1016/j.cub.2015.04.053](http://dx.doi.org/10.1016/j.cub.2015.04.053)
Winkler et al.: "Asymmetries in blue-yellow color perception and in the color" [http://dx.doi.org/10.1016/j.cub.2015.05.004](http://dx.doi.org/10.1016/j.cub.2015.05.004)

**MID SEMESTER BREAK**

**Week 6: Perception and warning signals**

Sometimes it is important to see things quickly and easily. Certain patterns are thought to draw attention to objects, in both human-designed and evolved situations. In this lecture we will explore what brain mechanisms may be at responsible for making ‘warning patterns’ easy to see.


**Seminar reading**


**Week 7: Perception for controlling locomotion**

We interact and move around in a complex world that can change very rapidly. We are able to react incredibly quickly to the external world, and adjust our own motions as appropriate. In this lecture we will explore what brain mechanisms are involved in our ability to judge and control our own motion, to control our progress through the natural environment.


**Seminar reading**


**Week 8: Designing an experiment**

This week we will dedicate the whole session to experiment design. Use one of these papers below, from weeks 6 or 7, as a start-point to extend the methodology to either improve the method, use a new method to answer a similar question, or develop this experiment to address a new question. See worksheet for this activity on Moodle. There will be the opportunity to take part in a
timed practise for an exam question on experiment design.


Week 9: Vision across different cultures
This session will focus on exploring issues around broadening perception research to be more inclusive. We will consider the doing of the science itself (what questions we ask, and of whom), and how culture could shape perception.


Further reading:

Week 10: Broadening our vision of vision science
This session will focus on exploring issues around broadening perception research to be more inclusive. We will explore some examples around understanding whose science is more well-known, and potentially favoured. There will be an interactive session involving you in generating ideas for how we could, and should, broaden how we learn and do vision science.


A feature article on women scientists in psychology: https://thepsychologist.bps.org.uk/volume-27/december-2014/women-scientists-psychology-time-action

Some online resources:
https://www.yourunion.net/representation/subcommittees/BAME/

Week 11: Review and Revision
A question session on lecture and seminar material. Please have questions and queries on ideas, techniques and tricky conceptual issues. We will also preview the exam format and look at sample exam questions.