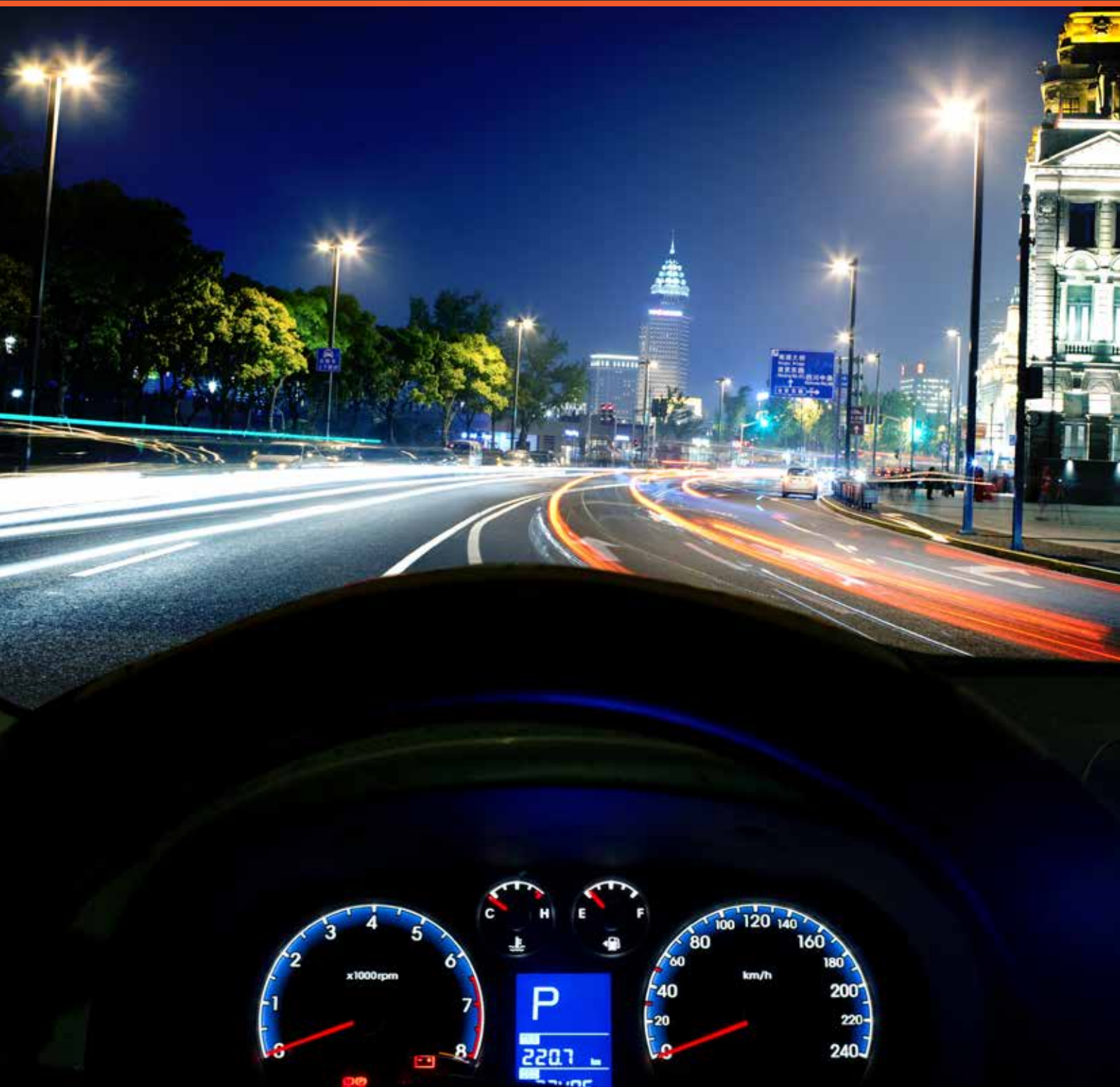
Brien Holden® VISION INSTITUTE ACADEMY

Global Optometry Resources

Visual Perception and Neurophysiology



VISUAL PERCEPTION AND NEUROPHYSIOLOGY

STUDENT MANUAL

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COURSE OUTLINE

COURSE AIM

This module aims to enable the student to understand the mechanisms underlying the neurological transformation of light stimulus and image perception.

COURSE OBJECTIVES

By the end of the module, students should be able to describe the perceptual and neurophysiological concepts underlying the phenomenon of vision.

By the end of the module the student should be able to:

- explain sensitivity to light stimulus
- describe visual acuity
- describe form sense
- explain electrophysiology the eye
- explain visual adaptation
- describe flicker phenomena
- explain color vision

COURSE CONTENT

The topics covered in this course include:

- Aberrometry (module 1)
- Power vectors, approach to vision science, absolute sensitivity (modules 2-4)
- Photometry, Lambertian surfaces, Duplex retina, Purkinje shift (5-8)
- Light adaptation, temporal summation, spatial vision (9-11)
- Fourier transformation, modulation transfer function, contrast sensitivity (12-16)
- Visual acuity (17)
- Temporal vision phenomena, motion perception (18-20)
- Introduction to colour vision, trichromacy, normal colour vision (21-22)
- Colour opponent theory, testing colour vision, acquired colour anomalies(23-25)
- Colour vision testing and Retinal electrophysiology (26-28)
- Parvo and magnocellular pathways (29)
- Frequency doubling, perimetry, VER, psychophysical testing, signal detection theory (30-32)
- ROC curves (33)

COURSE DELIVERY

This module is designed to be delivered over 1 semester. Total delivery time for Visual Perception and Neurophysiology is 56 hours of lectures.

Learning and Teaching Methods & Resources

The suggested teaching methods for this course include: PowerPoint presentations, simulations, tutorials, question and answer sessions, and self-directed study.

Suggested equipment for teaching includes:

- Computer & projector
- White board
- Handouts

RECOMMENDED ASSESSMENT

- Written examination
- Assignments

TEXT BOOKS

Prescribed texts

- Brien Holden Vision Institute Global Optometric Resources: http://www.brienholdenvision.org/education/optometry-resources.html
- Schwartz SH. Visual Perception. A Clinical Orientation. 4th Edition. Connecticut: Appleton & Lange. 2010.
- Bennett ES and Lakshminarayanan V. Review Questions for the NBEO Examination: Part 1. Butterworth Heinemann. 2005.

Recommended texts

- Benjamin W, Borish's Clinical Refraction, Butterworth-Heinnemann, 2007
- Cornsweet T. Visual Perception. Academic Press, New York, 1970.
- Heijl A, Patella VM. Essential Perimetry, 3rd Edition, Carl Zeiss Meditec, Dublin, CA, 2002.
- Nadler MP (ed). Glare and Contrast Sensitivity for Clinicians. Springer-Verlag, New York, 1990.
- Gescheider GA. Psychophysics: Method and Theory. Hillside, NJ, L. Erlbaum Associates, New York, distributed by Halsted Press, 1976.
- Russ JC. The Image Processing Handbook. CRC Press, Boca Raton, 1995.
- Swets JA, Dawes RM, Monahan J. Better Decisions through Science. Scientific American, October, 2000, p. 82-87.
- Norton TT, Corliss DA, Bailey JE. The psychophysical measurement of visual function, Butterworth-Heinemann, 2002.
- Anderson DR. Automated Static Perimetry, 2nd Edition. Mobsy, St. Louis, 1999.

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