



King Saud University
Applied Medical Sciences College
Quality and Development Unit



Course Syllabus

Course title and code:

OPTO 416 / Physiology of Vision II

Department : Optometry

Program in which the course is offered:

Optometry Doctor

Credit hours: 2+0

Total contact hours per semester: 24

Level at which this course is offered: 6

Course prerequisites:

OPTO 328 / Physiology of Vision I

Time: 10:00 -12:00

Location: room 32 second floor.

College member responsible for the course

Lec\ Tahani Alqahtani

Contact information:

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Office hours: 10:00 -11:00

Course Description

To provide material about functional retinal physiology, parallel processing of visual information and understand the component of electrical signals in the eye as well as color vision principle and testing.

Course Objectives

- i) Functional Retinal Physiology
- ii) Parallel Processing
- iii) Gross Electrical Potentials
- iv) Color Vision

Teaching strategies

Lectures, Blackboard, presentations.

Learning Resources

Required Text (s)

1. Visual Perception 4th edition by Steven Schwartz.
2. Basic Vision an introduction to visual perception by Robert Snowden, Peter Thompson, and Tom Troscianko.
3. Physiology of the Eye by Hugh *Davson*.

Topics to be covered

List of topics	Week due	Contact hours
<ul style="list-style-type: none">• Introduction and content of course.• Visual perception•• Visual Sensation vs. Visual Perception• Levels of Visual Processing• Specifying visual information based on their contrast and spatial frequency• Optical Processing and the role of optical transfer function.	1	2
<ul style="list-style-type: none">• Sampling frequency• Receptive Fields and Edge Detection• Contrast Sensitivity and Spatial Frequency Channels• Ganglion cells receptive field and edge detection• Alpha and Beta ganglion cells• Contrast Sensitivity and Spatial Frequency Channels	2	2
Stereopsis <ul style="list-style-type: none">• Edge detection in binocular vision• Fusion process• Panum's fusional area	3	2

<ul style="list-style-type: none"> • Depth perception • Perception of motion and directional sensitivity • Spatial and temporal stimuli • Sustained and transient pathway 		
<p>Psychological and Physiological Aspects of Motion Perception</p> <ul style="list-style-type: none"> • Dmax • Heuristics for Motion Perception • Cortical Correlates of Psychophysical Phenomena of Motion Perception • Cortical cells that play a role in motion perception • Motion Perception by a Moving Observer • Sequential- Parallel Model of Visual Information processing • Log- Polar transform of Neural image • Retinotopic Map of LGN • cortical magnification 	4	2
<p>Optical Illusion</p> <ul style="list-style-type: none"> • Definition • Types: <ul style="list-style-type: none"> – Simultaneous Contrast – Higher Integrative Activity – Vestibular Influences <p>Scientific explanation</p>	5	2
<p>Entopic Phenomena</p> <ul style="list-style-type: none"> • Difference between optical and physiological entopic phenomena <ul style="list-style-type: none"> – Entopic Shadows – Haidinger’s Brushes – Maxwell’s Spot • Causes <p>Clinical significance</p>	6	2
<p>Midterm 1</p>	7	1 hour 10-11

<p>Color Vision</p> <ul style="list-style-type: none"> • Color production and temperature • Color rendering index • Normal color vision • Trichromatic color vision • Metamers • Physiological Variations with Color Vision <p>Chromaticity diagram</p>	8	2
<p>Relative Luminous Efficiency</p> <ul style="list-style-type: none"> • Flicker Photometry. <p>Color vision anomalies</p> <ul style="list-style-type: none"> • Congenital and acquired color vision deficiency • Classification of Congenital Color Deficiency • Monochromatism • Incidence and Inheritance of Congenital Color Vision Defects • Spectral sensitivity curves for protanopia, deutanopia, and tritanopia • Neural points • Confusion line <p>CIE representation of confused colors in each deficiency</p>	9	2
<p>Tests for defective Color Vision</p> <ul style="list-style-type: none"> • Tests design • Function of Different types of Color Vision Tests: <ul style="list-style-type: none"> – <i>Pseudoisochromatic (PIC) Plates</i> – <i>Hue Discrimination Tests</i> – <i>Color Matching Tests</i> – <i>Lantern Tests</i> • Tests administration <p>Filter Aids for Color Deficient People</p>	10	2
<p>Students presentation</p>	11	2
<p>Midterm2</p>	12	1 hour 10-11

Schedule of Assessment Tasks for Students During the Semester

Assessment task	Week due	Proportion of Final Assessment
Midterm I	7	25%
Midterm II	12	30%
Class-discussion and participation	All weeks	2%
Assignment and Presentation	11	3%
End Semester Exam		40%

Note: the due weeks will change according to the exams dues.

Required Assignments:

Assignments	Evaluation	Week due
Presentation, activities or research	3	13

Criteria for evaluation: Knowledge, knowledge and knowledge.