

**2016**

**College of applied  
medical sciences**

**Optometry department**

# **WEEKLY COURSE PLAN**

## **[ Opto 416 - Physiology of Vision 2 ]**

**Course Code and Name:** Opto 416- Physiology of Vision 2  
**Units:** 2 Credit Hours  
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**Recommended textbooks:**

1. Visual Perception 4<sup>th</sup> 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 of the course (in details)**

**Weekly Lectures**

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

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

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

## Course Assessment methods

<b>Task/ Exam</b>	<b>Marks %</b>
<b>Midterm 1</b>	<b>25%</b>
<b>Midterm 2</b>	<b>25%</b>
<b>Presentation &amp; assignment</b>	<b>10%</b>
<b>Final Exam</b>	<b>40</b>
<b>Total</b>	<b>100</b>

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