

2015

**College of applied
medical sciences**

Optometry department

[Opto 328 - Physiology of Vision 1]

Course Code and Name: Opto 328 - Physiology of Vision 1

Units: 2 = Credit Hours

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Recommended textbooks:

1. Visual Perception 4th edition by Steven Schwartz.
2. Clinical anatomy and physiology of the visual system by Lee Ann Remington
3. Physiology of the Eye by Hugh *Davson*.

Topics of the course (in details)

Weekly Lectures

Week	Topic in details	Notes
1	Retinal structure and organization I <ul style="list-style-type: none">• Brief Overview of the Anatomy of the Eye.• Retinal landmarks and layers.• Structures and function of each layer• The interrelationship between retinal layers	
2	Retinal structure and organization II <ul style="list-style-type: none">• Photoreceptor structure (composition of rods and cones)• Photoreceptor distribution and functional implications.• Photopigment types and absorption characteristics.• Photopic and Scotopic vision.	
3	Photochemical and Electrophysiological Aspects of Vision (I) <ul style="list-style-type: none">• Depolarization, Hyperpolarization, action potential, graded potential.• Excitatory and inhibitory neurotransmitter.• Cone circuit of the retina.• Rod circuit of the retina.	

	<ul style="list-style-type: none"> • Thermal reaction. • Phototransduction cascade. • Restoration of normalcy in photoreceptor after cessation of light. • Production And Turnover Of Outer Segment Disc Lamellae • The role of the RPE • Overview of electrophysiology of vision 	
4	Photochemical and Electrophysiological Aspects of Vision (II) <ul style="list-style-type: none"> • Horizontal cells types and function. • Bipolar cells types, center-surround antagonism of the receptive field. • Ganglion cells types, center-surround antagonism of the receptive field, color opponency of the receptive field 	
5	Revision and tutorial	
6	Mid Term Exam 1	
7	Sensory aspect of vision Light Sense <ul style="list-style-type: none"> • Absolute and Differential Threshold. Duplicity theory of vision <i>Color Sense:</i> <ul style="list-style-type: none"> • Visible spectrum • Trichromatic color theory • Hue • saturation • Variation of Hue with Intensity • Making Color: Additive and subtractive color mixing • Color opponent theory • Complementary Hues • CIE color specification system-The Chromaticity Chart <i>Form Sense</i> <ul style="list-style-type: none"> • Resolving Power of the Eye and Visual Acuity 	

	<ul style="list-style-type: none"> • Spatial and temporal induction • Sampling Theorem • Aliasing • Hyperacuity • Point spread function • Ricco's Law • Piper's law 	
8	<p>Concept of threshold</p> <ul style="list-style-type: none"> • Minimum retinal illumination • Frequency-of-seeing Curve • Spatial and temporal Summation • Temporal Summation • Bunsen-Roscoe law • Visual persistence • Critical Fusion Frequency • Temporal Vision Laws/Effects • Effect of luminance on fusion frequency • Responding to Very High Rates of Flicker • Responding to Very Low Rates of "Flicker" Day/Night cycle 	
9	<p>Psychophysical methodology of Visual Assessment</p> <p>Clinical Electrophysiology</p> <ul style="list-style-type: none"> • Understanding the ERG • Functions and Importance of a well-taken ERG • The Basic Waveform of the ERG • ERG: waves origin in photopic and Scotopic ERG • ERG potentials that originate from third order retinal neurons • Scotopic threshold response • Multifocal ERG • Electrophysiological measures of RPE function :EOG, ERG C wave • Equipment and Use • Electrodes • Clinical procedure 	

10	Revision and tutorial	
11	Mid Term Exam 2	
12	<p>Psychophysical methodology of Visual Assessment</p> <ul style="list-style-type: none"> • Visual evoked potential • The mechanisms which underlie the VEP • Reasons for a predominant contribution of the central visual field to the VEP • Clinical uses of the VEP • Types of visual-evoked response tests • Recording The VEP • Types of VEPs • Simultaneous ERG and VEP Recordings • Clinical Procedure • Multifocal VEP 	
13	<p>Some Clinical implications of disruption in retinal and optic nerve function:</p> <ul style="list-style-type: none"> • Clinical conditions associated with rhodopsin mutation • Clinical conditions associated with rhodopsin deficiency • Clinical conditions associated with deficits in phototransduction Cascade • Clinical conditions associated with deficits in rhodopsin inactivation • Clinical conditions associated with retinal pigment epithelium Dysfunction • Clinical conditions associated with RPE dysfunction 	

Course Assessment methods

Task/ Exam	Marks %
Midterm 1	25%
Midterm 2	25%
Assignment	10%
Final Exam	40
Total	100

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