



University of Kerala

Discipline	ZOOLOGY				
Course Code	UK2DSCZOO104				
Course Title	Sensory Physiology				
Type of Course	DSC				
Semester	II				
Academic Level	100 – 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	4	4 hours	-	-	4
Pre-requisites	Pass in Class XII				
Course Summary	This course provides basic knowledge about the sense organs and the mechanisms by which humans receive information about their environment through sensory organs. The learner shall understand the functional anatomy of the main sense organs in our body.				

Detailed Syllabus

Module	Unit	Content	60 hrs
I		Photoreceptors	14
	1.1	Structure of human eye- mention rods and cones	3
	1.2	Physiology of vision, visual pigments, optics of vision (binocular vision and accommodation), light and dark adaptation	4
	1.3	Theories of colour vision-Trichromatic theory, Opponent-process theory	3
	1.4	Visual pathway from retina to cortex, neural basis of colour vision	2
	1.5	Visual defects- myopia, hypermetropia, presbyopia, astigmatism,	2

		cataract, glaucoma, amblyopia, colour blindness (brief account only)	
	Related activity: <i>Students are directed to conduct a survey based on visual defects among school or college students and present the report.</i>		
II	Audio receptors		12
	2.1	Structure of ear- Anatomy and functions of structural components	3
	2.2	Mechanism of hearing	3
	2.3	Auditory pathways-lemniscal and non-lemniscal pathways	4
	2.4	Hearing disorders – sensorineural, conductive and mixed hearing loss , Tinnitus, Meniere’s disease (brief account only)	2
	Related activity: <i>Students are directed to conduct a survey on hearing defects among school or college students and present the report.</i>		
III	Chemoreceptors		11
	3.1	Gustation – taste receptors and their mechanisms – perception of taste (salt, bitter, sweet, sour and umami), mention taste pathway	4
	3.2	Olfaction- olfactory receptors, olfactory pathways	4
	3.3	Interaction of taste and smell	2
	3.4	Disorders of olfaction and gustation- anosmia and ageusia (brief account only)	1
	Related activity: <i>Students can be encouraged to make a PowerPoint presentation on various factors that alter taste perception (group of 5 members).</i>		
IV	Pain receptors		15
	4.1	Nociceptors- different types (A-delta fibres, C-fibres, TRP receptors (brief account only)	2
	4.2	Types of pain-acute and chronic pain, neuropathic pain, Psychogenic pain, Phantom limb pain and mirror box, referred and visceral pain	3
	4.3	Clinical abnormalities of pain and other somatic sensations- Hyperalgesia, Thalamic syndrome, Tic Douloureux, Brown- Sequard Syndrome (All Brief account)	2
	4.4	Pain suppression system in brain and spinal cord- Ascending and descending pathways, Brain-opiate systems (endorphins and enkephalins) Gate control theory (Melzack and Wall theory)	5

	4.5	Pain treatment and management- opioid and non-opioid analgesics, anti-inflammatory drugs, muscle relaxants, Placebo effect, Acupuncture, TENS	3
	<i>Related activity: Identifying useful tips for managing pain</i>		
V	Cutaneous receptors and proprioceptors		12
	5.1	Touch and pressure receptors- Meissner's corpuscle, Merkel's discs, pacinian corpuscle, Ruffinis's endings (brief account only)	1
	5.2	Thermoreceptors-warm and cold receptors, A-delta fibres and C-delta fibres	2
	5.3	Position senses- muscle spindle and Golgi Tendon Organ (brief account only)	2
	5.4	Vestibular senses (Labyrinthine sense)- Otolith organs in inner ear, semi-circular canals- crista ampullaris (structure and function)	4
	<i>Related activity: Power point presentation on "Time perception".</i>		

References

1. Chaudhuri,S.K Concise Medical Physiology New Central Book Agency
2. Guyton,A.C. Text book of Medical Physiology,W.B. Saunders Co
3. Hilgar & Atkinson. Introduction of Psychology.
4. Kalat, J.W. Biological Psychology. CA: Wadsworth.
5. Levintha;. C.F Introduction to Physiological Psychology New Delhi Prentice Hall
6. Schneider, A. M., and Tarshis, B. An Introduction to Physiology. New York Random House.
7. Weiten, W. (2008) Psychology: Themes and variations 7th ed New York: Brooks/Cole.
8. <https://www.ncbi.nlm.nih.gov/books/NBK539861/>
9. <https://www.ncbi.nlm.nih.gov/books/NBK219252/>
10. <https://www.jax.org/news-and-insights/2019/april/mechanisms-of-sound-perception>
11. <https://www.aao.org/eye-health/anatomy/parts-of-eye>

Course Outcomes

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO-1	Understand the physiology, optics of vision and visual effects. Apply the knowledge on problem solving in eye defects and eye care practices. Capacity to analyze the factors responsible for the development of visual defects	U, Ap, An	PSO- 1,2, 3,4
CO-2	To understand the structure of ear, mechanism of hearing, hearing disorders, knowledge on how to use hearing aid and cochlear implants, analyze the effect of noise pollution and preventive measures, apply the knowledge on hearing disorders for recommend appropriate treatment and hearing aids	R, U, Ap, An	PSO- 1,2, 3,4
CO-3	Examine the mechanisms of gustation and olfaction, analyze their interplay, and apply this knowledge to address chemosensory disorders.	U, Ap, An,	PSO- 1,2, 3,4
CO-4	Evaluate pain mechanisms, analyze their clinical implications, and apply knowledge to propose innovative treatment modalities	U, Ap, An, C	PSO- 1,2, 3,4
CO-5	Analyze the processes of somatosensation and vestibular perception, apply concepts to explain related disorders, and create solutions to manage sensory challenge	U, Ap, An, C	PSO- 1,2, 3,4

R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create

Name of the Course: Sensory Physiology
Credits: 4:0:0 (Lecture: Tutorial: Practical)

CO No.	CO	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L)/Tutorial (T)	Practical (P)
1	Understand the physiology, optics of vision and visual effects. Apply the knowledge on problem solving in eye defects and eye care practices. Capacity to analyze the factors responsible for the development of visual defects	PO-1,2/ PSO- 1,2, 3,4	U, Ap, An	F, C	L	-
2	To understand the structure of ear, mechanism of hearing, hearing disorders, knowledge on how to use hearing aid and cochlear implants, analyze the effect of noise pollution and preventive measures, apply the knowledge on hearing disorders for recommend appropriate treatment and hearing aids	PO-1,2/ PSO- 1,2, 3,4	R, U, Ap, An	F, C	L	-
3	Examine the mechanisms of gustation and olfaction, analyze their interplay, and apply this knowledge to address chemosensory disorders.	PO-1,2/ PSO- 1,2, 3,4	U, Ap, An, C	F, C	L	-
4	Evaluate pain mechanisms, analyze their clinical implications, and apply knowledge to propose innovative treatment modalities	PO-1,2,3/ PSO- 1,2, 3,4	U, Ap, An, C	F, C	L	-
5	Analyze the processes of somatosensation and vestibular perception, apply concepts to explain related disorders, and create solutions to manage sensory challenge	PO-1,2,3/ PSO- 1,2, 3,4	U, Ap, An, C	F, C	L	-

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive
Mapping of COs with PSOs and POs**

	PS O1	PS O2	PS O3	PS O4	P S O 5	P S O 6	P S O 7	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1	3	3	1	1	-	-	-	3	3	-	-	-	-	-	-
CO 2	3	3	1	1	-	-	-	2	2	-	-	-	-	-	-
CO 3	3	3	1	1	-	-	-	2	2	-	-	-	-	-	-
CO 4	3	3	1	1	-	-	-	2	2	2	-	-	-	-	-
CO 5	3	3	1	1	-	-	-	2	2	2	-	-	-	-	-

Correlation Levels:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:**Assignment/ Seminar topics**

1. The role of sensory perception in everyday life
2. Prepare a power point presentation on the working of different sense organs
3. Diseases affecting different sense organs
4. Recent advancements in technology (e.g., virtual reality, neuroimaging) and their applications in studying sensory physiology,

Continuous Comprehensive Assessment

1. Assignments
2. Seminar
3. Submission of PowerPoint presentations
4. Test
5. Quiz/ Debate

End semester Evaluation

1. Multiple Choice Questions
2. Very Short Answer Questions
3. Short Answer type
4. Essay type

Mapping of COs to Assessment Rubrics:

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5	✓	✓		✓