University of Kerala

Discipline	**ZOOLOGY**				
Course Code	**UK3DSCZOO204**				
Course Title	**Body Functions and Regulation**				
Type of Course	**DSC**				
Semester	III				
Academic Level	200 – 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	4	4 hours	-	hours	4
Pre-requisites	Pass in Class XII				
Course Summary	Through the course, the student shall gain knowledge and can explore the research findings, case studies, and interdisciplinary perspectives to deepen their understanding of how physiological processes shape human behaviour. By integrating knowledge from neuroscience, endocrinology, and psychology, students gain a comprehensive understanding of the physiological basis of behaviour and its implications for health and well-being.				

Detailed Syllabus

Module	Unit	Content	60 hrs
I	**Eating and its regulation**		**11**
	1.1	Set point theories of hunger and eating: thermostatic theory, lipostatic theory and glucostatic theory	2
	1.2	Feeding centres in the brain- hypothalamus, hunger and satiety centres, arcuate nucleus, paraventricular nucleus, orexigenic and anorexigenic signals, orbitofrontal cortex, peripheral factors- ghrelin, insulin, leptin, nesfatin-1 and cholecystokinin	6

	1.3	Eating disorders: obesity (BMI, causes and management), brief account on polyphagia, aphagia, anorexia nervosa and bulimia nervosa	3
	Related activities: 1. *Survey based on the identification of obese people (group activity).* *2.Conduct awareness programmes through role play/group discussion related to nutritional components and their physiological role.*		
II	**Physiological basis of drinking**		**11**
	2.1	Water gain and loss in human body, thirst- osmotic thirst and hypovolemic thirst Regulation of thirst: thirst receptors, renin angiotensin system, hypothalamic control of thirst, anticipatory signals	6
	2.2	Disorders of water balance: dehydration, fluid sequestration, polydipsia, adipsia	5
III	**Sleep and dreaming**		**12**
	3.1	Stages of sleep and changes in EEG, NREM sleep, REM sleep and dreaming, functions of sleep	5
	3.2	Neural control of sleep – ARAS, brain stem nuclei, noradrenergic systems, serotonergic systems, cholinergic systems, reciprocal interaction model of sleep, role of hypothalamus	4
	3.3	Sleep disorders: insomnia, narcolepsy, sleep apnea, somnambulism, jet lag	3
	Related activity: *Identify people suffering from sleep disorders and provide advice for remedies by survey method.*		
IV	**Sexual behaviour**		**14**
	4.1	Definition of sex, dynamics of sexual behaviour- mating patterns based on number of mates and breeding period, external control of sexual behaviour- Coolidge effect; external cues	7
	4.2	Neural mechanisms of sexual behaviour- brain and sexual behaviour performance circuit, role of hypothalamus, pituitary and gonads- control of the secretion of sex hormones in male and female, role of pheromones	4
	4.3.	Chemical interventions and sexual behaviour – chemicals that target dopamine, serotonin, sexual orientation	3
	Related activity: *Conduct invited talks/power point presentation by students focusing on sexuality development and behaviour.*		
V		**Learning and memory**	12

	5.1	Learning – definition and types of learning- motor, verbal, concept, discrimination, principles of learning- problem solving, attitude learning	3
	5.2	Early learning discoveries – Pavlov's experiments, Lashley's work, Thompson's work, learning outside hippocampus	3
	5.3	Criteria of memory, types of memory- declarative/explicit, non-declarative/implicit, semantic and episodic memories, long term and short term memories Brain regions involved in learning and memory	3
	5.4	Neural mechanisms of memory: synaptic plasticity, Hebbian synapses, long term potentiation (LTP), hippocampus and glutamate receptors, engram	2
	5.5	Forgetting: theories of forgetting- interference theory, retrieval theory, weak storage theory.	1
	Related activities: 1. *Invited talks by neurologists/psychologists focusing on memory retention.* *2.Intraclass competition to find memory power among learners using randomly ordered words/items.*		

References

1. Kalat, J.W. Biological Psychology.
2. Levinthal, C.F. Introduction to Psychological Psychology.
3. Schneider, A, M., and Tarshis, B. An Introduction to Psychological Psychology. New York:Random House.
4. Coon, D., & Mitterer, J.O. (2007). Introduction to Psychology (11th ed.). New Delhi: Cengage Learning India Pvt. Ltd.
5. Ciccarelli, S.K., Meyer, G.E. (2008). Psychology (South Asian ed.). New Delhi: Durling Kindersley (India) Pvt. Ltd.
6. Psychology by David G Myres
7. https://www.sleepfoundation.org/dreams#:~:text=Dreaming%20is%20part%20of%20healthy,problematic%20if%20they%20occur%20frequently.
8. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4248571/
9. https://www.sciresliterature.org/Endocrinology/IJCE-ID17.pdf

Course Outcomes

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO-1	Comprehensive understanding of the neurobiological, physiological, and behavioral factors that influence feeding behavior, digestion, and body weight	U, An	PSO-1,2

	regulation. They will also gain insight into the causes, consequences, and management strategies for obesity, a major public health concern.		
CO-2	By achieving these learning outcomes, students will develop a comprehensive understanding of the neurobiological mechanisms underlying thirst regulation and drinking behavior. They will also gain insight into the physiological components, neural pathways, and feedback mechanisms involved in maintaining fluid balance and osmotic equilibrium in the body.	R, U	PSO-1, 2.3.4
CO-3	Understand the biological mechanisms underlying sleep and wakefulness, as well as the significance of circadian rhythms in regulating physiological and cognitive processes.	R, U	PSO-2,4
CO-4	Students will develop a comprehensive understanding of human sexuality, including biological, psychological, social, and cultural aspects. They will also gain insight into the factors influencing sexual development, behavior, and reproduction across the lifespan.	U, E	PSO-1,2,4
CO 5	Understanding these concepts provides insights into how we learn, remember, and adapt to our environment, forming the foundation of cognitive psychology and neuroscience.	An, E	PSO-2,4

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

Name of the Course: Body Functions and Regulation

Credits: 4:0:0 (Lecture: Tutorial: Practical)

CO No.	CO	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L)/Tutorial (T)	Practical (P)
1	Comprehensive understanding of the neurobiological, physiological, and behavioral factors that influence	PO-1, PO-2/PSO-1,2,4	U, An	F, C	L	

	feeding behavior, digestion, and body weight regulation. They will also gain insight into the causes, consequences, and management strategies for obesity, a major public health concern.					
2	By achieving these learning outcomes, students will develop a comprehensive understanding of the neurobiological mechanisms underlying thirst regulation and drinking behavior. They will also gain insight into the physiological components, neural pathways, and feedback mechanisms involved in maintaining fluid balance and osmotic equilibrium in the body.	PO-1,2/PSO-1,2,3,4	R, U	F,C	L	
3	Understand the biological mechanisms underlying sleep and wakefulness, as well as the significance of	PO-2,4/PSO-2,4	R, U	F,C	L	

	circadian rhythms in regulating physiological and cognitive processes.					
4	Students will develop a comprehensive understanding of human sexuality, including biological, psychological, social, and cultural aspects. They will also gain insight into the factors influencing sexual development, behavior, and reproduction across the lifespan.	PO-2,4/PSO-1,2,4	U, E	F, C	L	
5	Understanding these concepts provides insights into how we learn, remember, and adapt to our environment, forming the foundation of cognitive psychology and neuroscience.	PO-4,5/PSO-2,4	An, E	F,C	L	

F-Factual, C- Conceptual, P-Procedural, M-Metacognitive

Mapping of COs with PSOs and POs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	2	-	1	-	-	-	-	2	2	-	-	-	-	-	-
CO2	1	2	2	2	-	-	-	-	2	2	-	-	-	-	-	-
CO3	-	2	-	2	-	-	-	-	-	2	-	2	-	-	-	-
CO4	2	2	-	3	-	-	-	-	-	2	-	2	-	-	-	-
CO5	-	2	-	3	-	-	-	-	-	2	-	2	-	-	-	-

Correlation Levels:

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

Assessment Rubrics:

Assignment/ seminar topics

1. Labelled diagram of the human brain regions involved in feeding
2. Diagrammatic representation of interactions of various components of feeding
3. Age related difference in sleep
4. Water retention and body functions
5. Sleep and changes in EEG
6. Memory and ageing

Continuous Comprehensive Assessment

1. Assignments
2. Seminars
3. Test
4. Model preparation

End Semester evaluation

1. Multiple choice questions
2. Very short answer questions
3. Short answer questions
4. Essay type questions

Mapping of COs to Assessment Rubrics

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO5	✓	✓		✓