

## Sleep: Brain and Behavior, from flies to humans

The University of Michigan, Ann Arbor, Michigan

**Course description:**

The purpose of this course is to provide students with a comprehensive introduction to sleep, from behavioral, physiological and neurobiological perspectives. We will learn what is sleep and who sleeps, what are the functions of sleep, and which processes and neurobiological mechanisms regulate sleep. We will also discuss sleep disorders and the negative consequences of poor sleep for physical and mental health.

**Classes:**

Lecture #	Topic	Reading
1	<b>Introduction</b> – Course overview and expectations	
2	<b>What is Sleep</b> – From Gilgamesh to Stanford Sleep Clinic	[1]
3	<b>What is Sleep</b> – Polysomnography and Sleep States	[2]
4	<b>Who Sleeps</b> – Sleep Across the Animal Kingdom	[3]
5	<b>Who Sleeps</b> – <i>Student presentations</i>	
6	<b>Neuroscience Research Techniques</b>	
7	<b>Neuroscience Research Techniques</b>	
8	<b>Wake Regulation</b>	[4]
9	<b>NREM Sleep Regulation</b>	
10	<b>Neurobiology of Sleep and Wakefulness</b> – <i>Student presentations</i>	
11	<b>REM Sleep Regulation</b> , and sleep/wake models	[5]
12	<b>Pharmacology of Sleep and Wakefulness</b> – <i>Student presentations</i>	
13	<b>Sleep and Sedation</b>	
14	<b>Sleep Regulation</b> – Circadian Rhythms	
15	<b>Sleep Regulation</b> – The Circadian Clock	[6]
16	<b>Homeostatic Effectors</b> – <i>Student presentations</i>	
17	<b>Sleep Regulation</b> – Homeostatic Processes	
18	<b>Sleep and Health</b>	[7]
19	<b>Memory and Sleep</b> – <i>Student presentations</i>	[8]
20	<b>Functions of Sleep</b>	
21	<b>Functions of Sleep</b>	[9]
22	<b>Sleep Disorders</b> – <i>Student presentations</i>	[10]
23	<b>Sleep and Psychiatric Disorders</b>	
24	<b>Sleep and Dreaming</b>	
25	<b>Summary</b>	

**Reading:**

- Haba-Rubio and Krieger. A Brief History of Polysomnography and Sleep Medicine. Ch. 2. pp 19-24. 2012.
- Rama and Zachariah (2013) Normal human sleep. In: Kushida C (ed.) The Encyclopedia of Sleep, pp. 16-23.
- Siegel (2013) Evolution of Sleep. In: Kushida C (ed.) The Encyclopedia of Sleep, pp. 38-42.
- Nishino (2013) Neurotransmitters and Neuropharmacology of Sleep/Wake Regulations. In: Kushida C (ed.) The Encyclopedia of Sleep, pp. 395-406.
- Saper et al. (2010). Sleep State Switching. *Neuron* 1029-1032.
- Deboer (2020). Circadian regulation of sleep in mammals. *Current Opinion in Physiology*. 15, 89-95.
- Rudoy et al. (2009) Strengthening individual memories by reactivating them during sleep. *Science*. 326(5956): 1079.
- Heller (2013) The Function of Sleep. In: Kushida C (ed.) The Encyclopedia of Sleep, pp. 354-358.
- Hardin and Pandya (2013) Sleep Loss: Impact on Self-reported Sleepiness, Effort, Performance, and Motivation.
- Roth (2007) Insomnia: Definition, Prevalence, Etiology, and Consequences.