IT505: Brain and Cognitive Science

Credit: (3-0-0-3)
Instructor: Prof. Bakul Gohel

Objective:
The objective of this course is to familiarize the student about brain science and cognition, and its entanglement with artificial intelligence and computer sciences. This course will introduce you about how various mental processes (information processing) like sensation, perception, attention, memory, learning, action and decision making etc. that are accomplished by the brain. In the later part of this course, we will study the various topics and techniques in the area of artificial intelligences that are partly or fully inspired from the principles of information processing in the brain. This course will also introduce you about brain-computer interaction (BCI) and neuromorphic computing.

Content:
Human brain physiology and anatomy, sensory-motor function, attention, memory, learning, higher cognitive functions, neuroimaging techniques, analysis and interpretation of recorded brain activity. Neural network, artificial intelligence and other cognitive architecture inspired from brain functioning, computational neuroscience, brain-computer interaction and neuromorphic computing.

Outcomes:
1. The student will learn about the anatomy and physiology of the brain
2. The student will learn about the working principles of information processing in the brain
3. The student will learn about the analogy or relation between various machine learning techniques and various information processing principles in the brain
4. The student will learn about the use of some cognitive models in the development of artificial intelligence
5. The student will learn about brain signals and its role in developing various brain-computer interfaces

References:
3. Contents from various scholar articles, blogs, chapters, and books; that will be provided to the students in due course of time
Evaluation:
- First In-Semester Exam: 20%
- Second In-Semester Exam: 30%
- Final Exam: 30%
- Term Paper: 20%