

## Somatosensory System Learning Outcomes

As a result of your study the theory and related practical class on the somatosensory system you should:

1. Be able to explain the difference between the afferent (sensory) and efferent (motor) divisions of the nervous system.
2. Have an understanding of what the somatosensory system is and how it is different from the special senses.
3. Know the basic structural components of the somatosensory system and where these are located in both the peripheral and central nervous system.
4. Be able to explain what is meant by the terms transduction, frequency encoding, receptive field, innervation density and adaptation and be able to illustrate each of these with a physiological example.
5. Understand the difference between the seven sensations that arise from stimulation of the skin and the types of stimuli that elicit them.
6. Understand that each cutaneous sensation is the result of activation of a specific class of primary sensory neurone and that information about these stimuli reaches the cerebral cortex through a dedicated projection pathway.
7. Be able to describe the physiological properties of the three classes of primary sensory neurones responsible for mechanoreception and explain the type of information they encode.
8. Know what Von Frey hairs are and how you can use these to measure the relative innervation density for different skin regions.
9. Be able to demonstrate the two-point discrimination test and be able to explain how this test can be used to assess innervations density.
10. Be able to explain the structural and functional aspects of the mechanoreception projection pathway.
11. Be able to describe the physiological properties of the two classes of primary sensory neurone responsible for thermoreception and explain the type of information they encode.
12. Be able to explain the structural and functional aspects of the thermoreception projection pathway.
13. Understand the thermal paradox and how the physiological responses of thermoreceptors can explain it.
14. Be able to describe the physiological properties of the two classes of nociceptor and explain the type of information they encode.
15. Be able to explain why a high intensity mechanical stimulus such as a paper cut initially produces pain that has a sharp quality but is followed a few seconds later by pain that is described as having a burning quality.
16. Be able to describe the structural and functional aspects of the nociception projection pathway.
17. Be able to describe an experiment that demonstrates the type of nociceptors found in skeletal muscle and explain the psychological and physiological-basis for the results.