

## Science of Kriyayoga

**Lecture:** TBD  
**Instructor:** Dr. B. R. Singh  
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**Text:** We will not use a textbook per se for this course. However, the material covered will be referenced from the following books:

1. **The Sciences: An Integrated Approach** by James Trefil and Robert Hazen, John Wiley and Sons, 2000.
2. **Science of Kriya Yoga** by Roy Eugene Davis; Csa Press; ISBN: 9994112716; 1995.
3. **Kriya Yoga: The Science of Self-Realization** by J. R. Santiago, Book Faith India, 1999.
4. **Body, Mind and Spirit: YOGA SHAKTI: Fitness and Relaxation Highway** by C. M. Bhandari, Devamber Prakashan, New Delhi, 2002.
5. **Steps Towards Self-Realization** by Swami Sri Yogi Satyam, V. K. Kharbanda, Kriyayog Satsang Samiti, Prayag, India, 1999.
6. **The Chakra Handbook** by Shalila Sharamon and Bodo J. Baginski, Motilal Banarsidass Publishers Ltd., Delhi, 2003.
7. **Yog in Synergy with Medical Science**, by Acharya Balkrishna, Divya Prakashan, Haridwar, India, 2007.

*\*Literature articles will be referred to as needed*

### Grading:

Final grades will be awarded based on 3 best quizzes (20%), Mid-Term examination (30%), assignments based on best of 2 (10%), weekly exercises (10%), and the final examination (30%; the final will include 2 points for demonstrating exercises plus 98 points for written portion). Extra credits are provided (worth 1 point each in the final grade) for attending special seminars and preparing summaries.

### Course Objective, Outline, & Tentative Lecture Schedule:

The objective of the course is to introduce scientific concepts of modern times and relate them to scientific concepts such as the yoga of ancient times, which are becoming popular in today's society. The course will also aim to draw an analogy between modern and ancient scientific thoughts.

This course is designed to teach science using yoga concepts and practices. The course had been approved to meet the Science S Gen Ed requirement, and it is taught by incorporating a significant amount of science material. Students who are not interested in learning science are discouraged from registering for the course or are encouraged to talk to the instructor before registering. No previous science knowledge is expected to be required to register for the course.

### Part 1

1. Introduction to Science and Kriyayoga – Definition of science, history of science, influence of science and technology in human life, branches of science, science and society. Concept of Kriya (action) and yoga (union), body and mind, matter and metaphysics.

*Activity:* Introduction to the five senses of perception, and exercises involving breathing, stretching to demonstrate how observations are made by focusing on the perception of one's own body.

2. Origin of Kriyayoga – First description of Kriyayoga and its subsequent traditional lineage, scientific basis of Kriyayoga and Ashtanga Yoga.

*Connection to science:* Discussion on the concept of observation physically and mentally, creation of a mindset for objectivity and unbiased observations, by learning about critical examination with likes and dislikes.

3. Human Nervous System – Structure and function of the brain, the basic outline of the nervous system: central and peripheral nervous system, nerve-muscle junctions, neurotransmitters, hormonal control.

*Connection to yoga practice:* After learning basic components of the central and peripheral nervous system, exercises start with those terms while making postures. Knowing the functions of different parts of the brain allows us to connect some of the actions to certain parts of the brain.

4. History and Culture of Yoga - inspiration from nature, and influence on social, and cultural practices diversity in India

*Connection to classroom learning:* Examples of diversity, tolerance, nature observation, and deriving life's lessons from weather, geographical, and socio-political diversity.

5. Unit of Biological Systems – Cell structure and function, components, role, turnover, etc. Cells of different tissues – brain, muscle, glands, sensory organs, etc.

*Integration with yoga:* human, plant, and micro-organisms are made of building blocks - the cells. Cells work in union with each other to build a functional body.

6. Basic Concepts of Kriyayoga – Fundamental assumptions of kriyayoga, interconnectedness of human with infinite, basic concepts of kriyayoga practice.

*Connection to science:* The basic concept of kriya (action) as means of maintaining different parts of body, and by observing those actions intently one can learn about oneself in action.

## **Part 2**

7. Biological Respiration System – Human anatomy involved in respiration, blood constituents for respiration, cellular metabolism and energy generation in respiration and photosynthesis.

*Yoga connection:* Anabolism and catabolism as two opposites show balanced metabolism for the existence of life. Photosynthesis in plants producing oxygen and respiration in animals producing carbon dioxide complement at the environmental level, creating a concept of opposites being complementary but creating balance in the nature.

8. Chakra (energy centers) System: Prana (air) energy and its through energy channels. Link between energy centers and different parts of spinal cord. The concept of physical, ethereal, emotional, mental, spiritual bodies, and diseases.

*Science connection:* Introduction to National Center for Complementary and Alternative Medicine (NIH) for meridian energy system. The idea of acupressure, acupuncture, and chiro-practice.

9. Common Elements and Molecules in Biological Systems – Basic chemistry of carbon, hydrogen, nitrogen, sulfur, oxygen, and phosphorus. General structure of water, carbon dioxide, acids, bases, lipids, proteins, nucleic acids, membranes.

*Note:* These topics are considered during the discussions of cell structure, metabolism, and photosynthesis to highlight basic building blocks of body and organic matter. The basic points are made to show how cooperation amongst different atomic and molecular elements build a working body of human being. A general slide show is presented to provide a sense of structures at picometer in cell to light years in the cosmos.

10. Structure of Matter – Atomic theory, initial concepts of atomic structure, atomic particles and subparticles, quantum concept of atomic structure (conceptual). Connection of negative and positive charges to negative and positive thoughts. Noble gases and

human nobility.

*Yoga integration:* negatively charged electrons and positively charged protons, form an atom, the basis of matter. Same way negative and positive in human experience make the life. There is a concept of ideal or noble gas in chemistry, which explains a particular electronic structure that leads these elements to be relatively non-reactive. This is similar to the yoga concept of being non-reactive and equanimity which makes a person patience and perseverance. Noble humans are also calm and non-reactive. Also, formation of bonds between two or more atoms reflect the concept of union in yoga.

11. Scientific Theories - Basic concepts of kinetic theory of gases, Newtonian laws of motion, Electromagnetic theory of light, the Big Bang theory of the origin of universe conservation of matter and energy.

*Note:* Discussion revolves around energy and matter as being interchangeable and the two fundamental components of visible and invisible (dark matter) universe.

12. Forces – Basic definition and examples of electrical, magnetic, gravitational, ionic, Vander waals, hydrophobic, hydrophilic forces. Neutral forces and charged forces, and their connection to human reactivity.

*Integration with yoga:* The concepts of forces are provided for the contemplation of invisible energy that holds matter, similar to energy concepts in yoga that can be manipulated by paying attention to different part of body during stretch and breathing.

### **Part 3**

13. Basic Elements of Life – 24 yogic elements of life, nutrition for body and mind.

*Note:* the 24 elements of life involve body perception and action systems, which are combined under mind's control leading to wisdom and consciousness.

14. Kriyayoga and Health – Concept of health, health and modern medicine, health with kriya.

*Science and yoga integration:* Some of the modern causes of diseases, such as stress and chemicals are highlighted, and kriya (action) through exercises and relaxation are presented as preventive actions. Examples of scientific studies are provided as references.

15. Basic Practice of Kriyayoga – a combination of body, mind, sound, and light (no instruments needed) practices of kriyayoga.

*Science and yoga integration:* 43 steps of exercise involving different part of body, observation of changes, documentation of change observation through filling out a form, and comparing the data is shown as a way to keep observing one's progress. Breathing,

visual, touch, and sound exercises are introduced to link with brain and meditation. These practices are done throughout the semester.