

BANGALORE UNIVERSITY

Soft Skills ('Mrudu Kousalya') Paper

3rd Semester B.A./B.Com./B.B.M./B.H.M. from 2015-16

SCIENCE AND SOCIETY

2 Credits

Max. Marks: 100

Hours of Teaching: 39-42

Objectives

We inhabit a world today that is shaped significantly by Science and Technology(S&T). S&T has enriched our lives and proved to be beneficial in our livelihoods. At the same time, many of the products of S&T pose challenges, and in ways, even threaten the existence of societies. This course, meant for students of the humanities/commerce streams, is to provide an overview of the nature of S&T and its interaction with society. It is meant to provide a broad introduction to the most significant discoveries and inventions of modern science that have changed our lives and to bring into focus the need for developing a critical appraisal of the issues related to the connection of S&T with society.

Notes to the Instructor(s)

1. All the units under this syllabus may be taught by any qualified science Post-Graduate teacher. However, the units may be taught in collaboration with the concerned faculty.
2. **Unit I (A):** A brief introduction to science and the practice of the scientific method as it has come to be understood in the 20th century, with a historical outline that provides a flavor of the developments that led to modern science and the contributions of different civilizations in this direction.
- Unit I (B):** A discussion on how the discoveries of science transform to technologies and also how technologies have enabled to ask new scientific questions with suitable examples.
3. **Unit II:** This unit explores through specific examples, the discoveries in science that have profoundly impacted civilizations. It is to provide some basic information and introduce some of the consequences of the products of these discoveries on the safety of humans.
4. **Unit III:** This unit is to explore the impact of S&T on socio-economic sphere and the lives of individuals. It will also delve into environmental issues concerned with the deployment of technologies on a large scale.

Unit I: Introduction to Science:

(13 Hours)

A. What is Science & History of Science

(4 hrs.)

- *What is Science? The revolutions in Physics - Contributions of Copernicus and Galileo; A brief history of the Renaissance in Europe; Age of Enlightenment; Industrial Revolution; Science in the 20th century.*

- *Modern Science and the Scientific Method* (2 hrs.)
A discussion on hypothesis, experimentation, criteria for experimentation, theorizing, and the open-ended nature of the scientific quest
 - *Science in other Cultures* (2 hrs.)
A brief exploration of science and technology in pre-modern era with emphasis on India in areas of Mathematics, Metallurgical Sciences, Medicine and Health
- B. The interdependence of Science and Technology
- *Molecular basis of disease and vaccination* (1hr.)
 - *Laser and photonics applications* (1 hr.)
 - *Microscopy and applications* (1 hr.)
- C. Science and the Public (2 hrs.)
- *Discussion on the need for an informed public in a democracy about S&T, Science policy and research funding, S&T and development*

Unit II: Modern Science and its impact on Societies:

(13 Hours)

- *Theory of Evolution: A lecture summarizing the modern theory of evolution of species and its implications* (1 hr.)
- *Discovery of Antibiotics: What is an antibiotic and how does it work? A brief history of the discovery of antibiotics and its impact on health. Adversities due to misuse of antibiotics* (2 hrs.)
- *Soaps, Detergents, Polymers and Chemicals: Their use and abuse* (2 hrs.)
- *Atomic Energy : Introduction to fission and fusion reactions, atomic reactors and power plants; nuclear weapons; Chernobyl accident* (2 hrs.)
- *Space Sciences: History of space exploration; Sputnik and US space programme; Modern satellites, Applications in weather prediction and analysis; remote sensing with reference to Indian space programme.* (2 hrs.)
- *Genetics and human health: Introduction to gene, DNA and basis of heredity; some issues of health linked to genetics* (2 hrs.)
- *Nanotechnology, Smart materials: Introduction to nanotechnology and examples of some devices that use nanotechnology. A brief survey of smart materials* (2 hrs.)

Unit III: Science, Life and Livelihoods:

(13 Hours)

- *India's agricultural productivity and dairy development: The Green and White Revolutions; The Gene Revolution and GM Crops* (3 hrs.)
- *Information Revolution: The impact of internet and web-based technologies* (2 hrs.)
- *Impact of high-tech devices on emotional, social and cognitive facets of humans* (2 hrs.)
- *Energy issues and renewable energy sources: solar, wind, bio-fuels* (3 hrs.)
- *Climate Change* (3 hrs.)

Reference List

- Bala, Arun, 2008, *The Dialogue of Civilizations in the Birth of Modern Science*, New York, NY: Macmillan.
 - Biswas, Arun Kumar (Edited), 2001, *History, Science and Society in the Indian Context : A Collection of Papers*, The Asiatic Society, xv, 474 p, ISBN : 8172361033.
 - Fouad Abd-El-Khalick, 2005, *Developing Deeper Understandings of Nature of Science: The Impact of a Philosophy of Science Course on Pre-service Science Teachers' Views and Instructional Planning*, International Journal of Science Education , Vol. 27, Iss. 1.
 - Russell, B., (1985), *The Impact of Science on Society*, Psychology Press.
 - Singh, S., K. C. Garg, S. Pruthi, B. Dutt (2001) *Indicators of Indian Science and Technology*, (NISTADS), Allied Publishers.
 - Stanford Encyclopedia of Philosophy: Helen Longino's "*The Social Dimensions of Scientific Knowledge*" (HTML) [www.http://plato.stanford.edu/entries/scientific-knowledge-social/](http://plato.stanford.edu/entries/scientific-knowledge-social/)
 - University of California, Berkeley: Understanding Science: P. Godfrey-Smith's "*The Philosophy of Science*" (HTML) <http://undsci.berkeley.edu/article/philosophy>
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Scheme of Examination

End-Semester Examination: 70 marks

Internal Assessment: 30 marks (Test/s: 20 marks; Seminar: 5 marks; Project: 5 marks)

Total: 100 marks

Question Paper Pattern for End-Semester Examination

a. 40 Multiple-Choice Questions x 1 mark = 40 marks

b. 15 Multiple-Choice Questions x 2 marks = 30 marks

Total = 70 marks
