

J.S. University, Shikohabad

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Value Added Course

Science and Society

Course Code- VAC-069

Department Of Zoology

Faculty of Science



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Faculty of Science

Value Added Course
AY-2019-20

Science and Society

Learning Objectives:

This paper is interdisciplinary in nature and would provide students with basic exposure to scientific methods, Technologies and developments that have played a significant role in the evolution of human society from ancient to modern times. The primary objective of this course is to instill in students an appreciation for science and a scientific outlook and temper. The course further aims to increase awareness about fundamental scientific concepts that play an important role in our daily life using various examples and case studies. Students would also be made aware of the scientific rationale of technological developments that would enable them to make informed decisions about their potential impact on society.

Duration: 30 Hours. (Theory and Practical)

Course Outcomes:

1. To generate qualified students who can directly get jobs in the allied fields of Science and Technology.
2. To understand and create awareness about Ancient to Modern Times Scientific Principles and Concepts in Daily Life.
3. It helps in Contemporary Developments.

Syllabus:

Module- I Pedagogy-

- Pedagogy in this course should largely rely on learning by enquiry, observations, experimentation and group discussions using case studies/examples.



- Efforts should be made to instill an interest in students for science. Students should be encouraged to understand and appreciate scientific concepts and their applications rather than solely memorizing factual information.
- The faculty may refer to books/ articles/ reviewed documentaries/ films etc. from academic institutions or other reliable sources. A Few suggestive links are provided in the Suggested Reading/Resources Section below.
- In the spirit of exposition of popular science, Subject/Domain experts may also be invited for lectures and interactions with students.

Module- II Science and Technology — from Ancient to Modern Times

- Philosophy of science, the scientific method, importance of observation, questions and experimental design, rational thinking, myths vs. facts.
- Science, Technology and Traditional Practices: Suggestive areas include:
- Water harvesting structures and practices Construction, architecture and design — use of natural environment-friendly designs and materials.
- Agriculture including domestication of plants and animals.



Module- III Science and Technology in Modern Times: Suggestive areas include:

- Public Health: Nutrition, hygiene, Physical and Mental Health, Vaccines and Antibiotics, Anti-microbial resistance
- Food Security: Green Revolution, White Revolution
- IT Revolution, e Governance
- Clean Energy, Renewable Energy
- Space Science and Exploration
- Evolution, Ecology and Environment

In this section, students should also be made aware about the contributions of Indian scientists since ancient times and the contributions of women in science.

Module- IV Scientific Principles and Concepts in Daily Life

This section aims to encourage appreciation of the scientific method through observation, experimentation, analysis and discussions. Students are required to participate in activities and experiments. A suggestive list is given below:

Suggested Activities:

- Observing and documenting flora and fauna of College campus/city.
- Visits to science laboratories in the College or neighboring College/Institute.
- Visits to science museums, planetarium.
- Visits to biodiversity parks and nature walks.
- Participation in a citizen science project/initiative.



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Suggested Experiments/Practical:

- Measuring the height of the college building using a stick.
- Measuring the curvature of earth, using distance and shadow length.
- Isolation of DNA (DNA Spooling).
- Observing transpiration and photosynthesis in plants.
- The blood typing game (online)
- Are fruit juices, soap, carbonated drinks acidic or alkaline? (Using pH strips or developing your own Litmus Test)
- Do plants team and remember?
- Experiments on how migratory birds find their way
- How can a mosquito sit on a water surface or a blade float on water.
- How does a submarine dip or rise in the ocean?
- How and why does the path of the sun in the sky change with the seasons?
- Identification of celestial objects with the naked eye
- Types of clouds
- Science of musical sounds
- Science of splitting of colours from white light: rainbow, CD-rom, prism, oil films
- Lenses, mirrors and the human eye

Contemporary Developments:

The section would focus on current topics of major interest. Suggestive areas include:



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- Climate change and global warming
- Threats to biodiversity and habitat degradation
- Genomics and modern medicine
- Genetically engineered crops
- Artificial intelligence and robotics
- Big Data Analytics
- Citizen science and science communication
- Science of natural disasters and their management
- Any other Practical/Practice as decided from time to time

Suggested Books / Resources:

The list given below comprises only suggestive references. Faculty members conducting this course are encouraged to explore and use other resources subject to the condition that these are updated, authentic and are derived from sources with strong academic credentials or expertise and are supported by strong evidence.

Suggested Books:

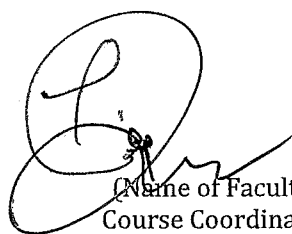
- Basu and Khan (2001). *Marching Ahead with Science*. National Book Trust
- Gopalakrishnan (2006). *Inventors who Revolutionised our Lives*. National Book Trust
- Yash Pal and Rahul Pal (2013) *Random Curiosity*. National Book Trust
- Hakob Barseghyan, Nicholas Overgaard, and Gregory Rupik (****) *Introduction to History and Philosophy of Science* (licensed under a Creative Commons Attribution 4.0 International License)



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- John Avery (2005). Science and Society, 2nd Edition.
- Dharampal (2000). Indian Science and Technology in the Eighteenth Century.



(Name of Faculty)
Course Coordinator

Dr. Tazim Yadan



(Name of Faculty)
Dean Academics

Dr. P. P. Singh



(Name of Faculty)
Director/Principal/Dean of
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