

**Shri Govind Guru University, Vinzol**

**B. Sc. Semester –III**

**BSC23VA301(IKS)**

### **ANCIENT INDIAN SCIENCE, ENGINEERING AND TECHNOLOGY**

**Learning objectives:** To review & strengthen the ancient discovery and research in physics, chemistry, maths, metallurgy, astronomy, architecture, textile, transport, agriculture and Ayurveda etc. To help students to trace, identify and develop the ancient knowledge systems to make meaningful contribution to development of science today.

**Learning outcomes:** After the completion of the course students will be able to trace historical development of science and technology in Indian subcontinent. This course will enhance students' understanding regarding the research of ancient Indian scientists and will help them to appreciate Indian culture of science and further build upon their research work.

#### **UNIT - 1: Indian Traditional Science and Practices**

Introduction to the Science and way of doing science and research in India, Ancient Science in Intra & Inter Culture Dialogue & coevolution. Traditional water-harvesting practices, Traditional Livestock and veterinary Sciences Traditional Houses & villages, Traditional Forecasting, Traditional Ayurveda & plant based medicine, Traditional writing Technology.

*Physics in India:* Vaisheshikadarshan, Atomic theory & law of motion, theory of panchmahabhoota, BrihathShathaka (divisions of the time, unit of distance), bhaskaracharya (theory of gravity, suryasiddhanta&sidhantashriomani), Lilavati (gurutvakashan Shakti).

*Chemistry in India:* Vatsyayana, Nagarjuna, Khanda, Al-Biruni, Vagbhata –building of the ras-shala (laboratory), working arrangements of ras-shala, material and equipment, YasodharaBhatta-process of distillation, apparatus, saranasamskara, saranataila.

*Mathematics in India:* Baudhayana's Sulbasutras, Aryabhata, Bhaskaracharya-I, Severus Sebokht, Syria, Brahmagupta, Bhaskaracharya-II, Jyesthadeva.

#### **UNIT - 2: Ancient Indian Science (Textile, Agriculture, Transport)**

*Textile Technology in India:* Cotton (natural cellulose fiber), silk, wool (natural protein fibers), bast and leaf fibers, mridhudhautadhupitambaram (meaning a practice of fumigating the fabric with incense smoke before use as a part of the finishing process), sitadhautavasanyugala (bleached white—a finishing process); suchastah, sutradharah (needle and thread – tools for stitching). Dyeing, washing spinning and weaving technology.

*Agriculture in India:* Traditional agricultural practices, krishisuktas, Krishiparashara, Brihatsamhita, Types of crops, Manures, Types of land- devamatraka, nadimatraka, use of animals in warfare, animal husbandry, Animals for medicines. Ancient transport in India.

**Shri Govind Guru University, Vinzol**  
**B. Sc. Semester –IV**  
**BSC23VA401**  
**CONSTITUTIONAL VALUES AND FUNDAMENTAL DUTIES**

**Learning Objectives**

The Learning Objectives of this course are as follows: Enrich students with knowledge and relevance of the Constitution. Develop awareness about Duties and Values. Inculcate a sense of Constitutionalism in thought and action.

**Learning outcomes**

The Learning Outcomes of this course are as follows: Understand the Constitution and its relevance. Appreciate the values and goals embedded in the Constitution. Recognise the importance of Fundamental Duties enshrined in the Constitution. Apply the spirit of fundamental values and duties in everyday national life.

**UNIT- 1 The Constitution of India - An Introduction**

Federal Republic, Rule of Law, Separation of Powers, Sovereignty, Socialism, Democracy, Secularism and Sarva Dharma Sama Bhava

**Constitutional Values**

Justice: Social, Political, Economic, Liberty: Thought, Expression, Belief, Faith, Worship, Equality: Equality before law & equal application of laws, Fraternity: Dignity, Unity and Integrity

**UNIT- 2 Fundamental Duties**

Reflecting on the ancient Indian notions of righteousness and duty consciousness, Fundamental Duties- Article 51A [(a)- (k)], Legal status of Fundamental Duties - Judicial approach.

**REFERENCES**

1. Durga Das Basu, et al., Introduction to the Constitution of India (LexisNexis, 26th edn, 2022).
2. Leila Seth, We, the Children of India: The Preamble to Our Constitution (New Delhi, Puffin Books, Penguin Books India, 2010).
3. Mahendra Pal Singh, V.N. Shukla's Constitution of India, (Eastern Book Company, Lucknow, 13th revised edn. 2017)
4. B.R. Ambedkar Selected Speeches, (PrasarBharati, New Delhi, 2019) available at: <https://prasarbharati.gov.in/whatsnew/whatsnew 653363.pdf>.