University of Mumbai

R. P. Gogate College of Arts & Science,

And

R. V. Jogalekar College of Commerce, Ratnagiri. (Autonomous)

Course Structure

Indian Knowledge System (I.K.S.)

First Semester for F.Y.B.Sc.

Under Choice Based Credit System (CBCS)

To be implemented form

Academic Year 2023 – 24

Syllabus for Autonomous from the year 2023-24.

Name of the Course	History Of Science & Technology In India.
Course Code (refer to student handbook)	USIKS-101
Class	F.Y.B.Sc.
Semester	I
No of Credits	02
Nature	Theory
Type (applicable to NEP only)	IKS
Highlight revision specific to employability/ entrepreneurship/ skill development (if any) 100 words	1) Ancient Indian philosophy, science, and scientific thought were deeply intertwined with spirituality and metaphysics. Philosophical texts like the Upanishads explored the nature of reality, consciousness, and the self. These ancient teachings emphasized critical thinking and logical reasoning, contributing to the development of a rich philosophical tradition. In the field of science, ancient Indian scholars made significant advancements in mathematics, astronomy, and medicine. Aryabhata's work in astronomy, including the concept of Earth's rotation, demonstrated a sophisticated understanding of celestial mechanics. Charka's treatise on Ayurveda laid the foundation for traditional medicine, focusing on holistic well-being. 2) During the medieval period, India witnessed a flourishing of science, technology, and engineering. The works of mathematicians like Bhaskara II brought significant contributions to trigonometry and calculus. Progress in metallurgy, particularly in iron and steel production, enabled the construction of remarkable architectural marvels like the Iron Pillar in Delhi. 3) In contemporary times, India has embraced a transformative approach towards employability, entrepreneurship, and skill development. The government has launched ambitious programs like Skill India and Start-up India, aiming to empower the workforce with relevant skills and encourage innovation-driven entrepreneurship. Employability has been enhanced through various initiatives, such as vocational training programs and industry-academia collaborations. The focus on skill development has led to a more capable and adaptable workforce, making them competitive in the global job market. 4) Moreover, entrepreneurship has been actively promoted through funding schemes, incubation centres, and mentorship support. The rise of technology start-ups in India, especially in sectors like IT,

	biotechnology, and renewable energy, has bolstered economic growth and employment opportunities. In conclusion, the journey of India's knowledge tradition from ancient times to the contemporary era reflects a consistent emphasis on the development of employability skills and entrepreneurial spirit. By embracing its rich heritage and fostering innovation, India continues to evolve as a major player in the global scientific and technological landscape.

Nomenclature:-Glorious History Of Science And Technology In India.- F.Y.B.Sc.

- Course Outcomes:

CO1- students will gain a comprehensive understanding of the diverse and intellectually stimulating world of ancient Indian philosophy, science, and scientific thought and recognize their enduring impact on human knowledge and civilization.

CO2 - students will gain a comprehensive understanding of the significant scientific and technological achievements of ancient and medieval India, appreciating the innovative spirit and practical wisdom of those eras.

CO3 - students will gain a comprehensive understanding of the current scientific and technological landscape in India, including the latest advancements, challenges, and opportunities. They will be equipped to critically analyze scientific information, engage in discussions about the social and ethical dimensions of technology, and appreciate the role of science and technology in shaping India's future.

- Curriculum:

Unit	Title	Learning Points	No of Lectures
I	Ancient Indian Philosophy, Science & Scientific Thought.	1.1 Introduction to ancient Indian contributions in Mathematics and Astronomy. 1.2 Study of important Mathematicians like Aryabhata, Brahmagupta, and Bhaskara. 1.3 Overview of Indian achievements in the field of Metallurgy, Chemistry, and Medicine. 1.4 Understanding the Scientific Principles in ancient Indian texts like a Vedas and Upanishads. 1.5 Exploration of connections between Indian philosophy and Scientific thinking. 1.6 Analysis of concepts like Cosmology, Time, and Causality in Indian Philosophical Systems. 1.7 Influence of Indian Philosophical ideas on the development of Scientific thought.	10
II	Ancient,	2.1 Overview of ancient Indian Engineering marvels like step	10

	Medieval Indian Science, Technology and Engineering.	wells, temples, and Forts. 2.2 Study of Indian contributions to Architecture, town planning, and irrigation Systems. 2.3 Examination of ancient Indian technological advancements in Metallurgy,Textiles,- etc. 2.4 Study of Indian scholars' contributions in Mathematics, Astronomy,during the medieval period. 2.5 Analysis of advancements in fields like Alchemy and Chemistry. 2.6 Indian Scientific Literature and Manuscripts: -Introduction to ancient and medieval Indian scientific texts and manuscripts, Study of the transmission of scientific knowledge through Manuscripts.	
III	Contemporary Indian Science and Technology.	3.1 Overview of the development of Modern Science in India during the colonial era. 3.2 Study of Indian Scientists' contributions to various Scientific disciplines. 3.3 Examination of Scientific Institutions and Organizations in Modern India. 3.4 Analysis of India's scientific achievements and advancements in the post-Independence era. 3.5 Study of contemporary research and developments in fields like Space Technology, Biotechnology and Information technology.	10

Learning Resources recommended:

(1) Indian Knowledge System. Kapil Kapoor, Avadhesh kumar Singh, D.K. Print word, Pvt.Ltd.2055
(2) Science and Technology in Ancient India. Sanskrit Pustaak Bhandar -2008.
(3) Encyclopedia of the History Of Science, Technology and Medicine in Non-Western Culture.-Helaine Selin- Kluwer Academic Publishers.
4) Indian Science and Technology- In the Eighteen Century.-Dharma Pal, Center for Policy Studies, Chennai.
(4) प्राचीन भारताचा इतिहास- आर.एन. गायधनी , अनिरुद्ध पब्लिशर.
(5) मध्ययुगीन भारताचा इतिहास- आर.एन. गायधनी , अनिरुद्ध पब्लिशर.
(6) भारतीय कलेचा इतिहास – संध्या केतकर, २०१९ ज्योत्सना प्रकाशन.
(७) विज्ञान इतिहास – प्रा.राजे,प्रा. पोतनीस, प्रा. कुलकर्णी.- देशमुख प्रकाशन , पुणे.

❖ Teaching plan:

Unit	Title	Expected date of completion	Teaching methods
I	Ancient Indian Philosophy, Science & Scientific Thought.	31/07/2023	Chalk and Talk, PPT, AV resources
II	Ancient, Medieval Indian Science, Technology and Engineering.	31/08/2023	Chalk and Talk, PPT, AV resources
III	Contemporary Indian Science and Technology.	30/09/2023	Chalk and Talk, PPT, AV resources/ Field visit/ Problem base/ Project base / Experiential learning

Evaluation Pattern

A. Internal Evaluation

Method	Marks
Unit Test.	20
Home Assignment.	10
Active Classroom participation/Presentation/ viva	10
Total	40

B. Semester End Evaluation (Paper Pattern)

Question No	Unit	Particular	Marks
1	I	Long answer question with internal option.	15
2	I	Long answer question with internal option.	15
3	II	Long answer question with internal option.	15
4	I to III	Write short note. (three out of five)	15
Total			60