GH raisoni COLLEGE | Engineering and Management Nagpur

raisoni EDUCATION

# E-Content

# by

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## First Year Engineering Department

## Subject -Indian Knowledge System: Concepts In Engineering

# Content:

- ***Introduction to Indian knowledge System.***
- ***The Vedic Corpus.***
- ***Number systems and Units of Measurements & Mathematics.***
- ***Engineering and Technology: Metals and Metalworking.***
- ***Engineering and Technology: Other Applications.***

# COURSE OVERVIEW: UNDERSTANDING OUR HERITAGE

## UNDERSTANDING INDIA'S KNOWLEDGE HERITAGE

Explore the vast intellectual traditions that have shaped Indian civilization for millennia, from ancient mathematics to profound philosophical systems.

## CONNECTING PAST WITH PRESENT

Bridge traditional knowledge with modern scientific inquiry, discovering how ancient insights remain relevant in contemporary research and innovation.

## EDUCATIONAL SIGNIFICANCE

Understand why IKS matters in modern education, enriching curricula with diverse perspectives and interdisciplinary approaches to knowledge.

# WHAT IS IKS?

Indian Knowledge Systems represent the cumulative body of knowledge, practices, and traditions developed in India over thousands of years. This encompasses scientific discoveries, technological innovations, artistic expressions, philosophical insights, and cultural practices that have shaped civilizations across Asia and beyond.



IKS is not merely a collection of historical artifacts—it's a living tradition that continues to influence contemporary thought, practice, and innovation.

# THE BREADTH OF IKS: MATHEMATICS & ASTRONOMY

## MATHEMATICAL INNOVATIONS

Zero, decimal system, algebra, trigonometry, and calculus concepts developed centuries before Western mathematicians.

## ASTRONOMICAL MASTERY

Precise calculations of planetary movements, eclipses, and timekeeping using sophisticated observational techniques.

## ENDURING LEGACY

Foundational contributions that became the basis for modern mathematics and computational science worldwide.



# THE BREADTH OF IKS: MEDICINE & HEALTH



## AYURVEDA: SCIENCE OF LIFE

A holistic health system emphasizing balance between body, mind, and spirit through natural remedies, diet, and lifestyle.

- Personalized treatment based on dosha types
- Herbal medicine and natural therapies
- Preventive care and wellness practices
- Integration of physical and mental health

# THE BREADTH OF IKS: TECHNOLOGY & CRAFT

## METALLURGY

Advanced iron smelting, wootz steel production, and corrosion-resistant alloys demonstrating sophisticated materials science.





## ARCHITECTURE

Structural engineering principles, earthquake-resistant construction, temple architecture, and urban planning expertise.

# SHASTRA & PRAYOGA: THE TWO PILLARS OF IKS

## SHASTRA

### THEORETICAL KNOWLEDGE

Systematic frameworks, principles, and conceptual understanding that form the foundation of knowledge.

- Mathematical theorems and proofs
- Medical theories and diagnostics
- Philosophical systems
- Scientific principles



## PRAYOGA

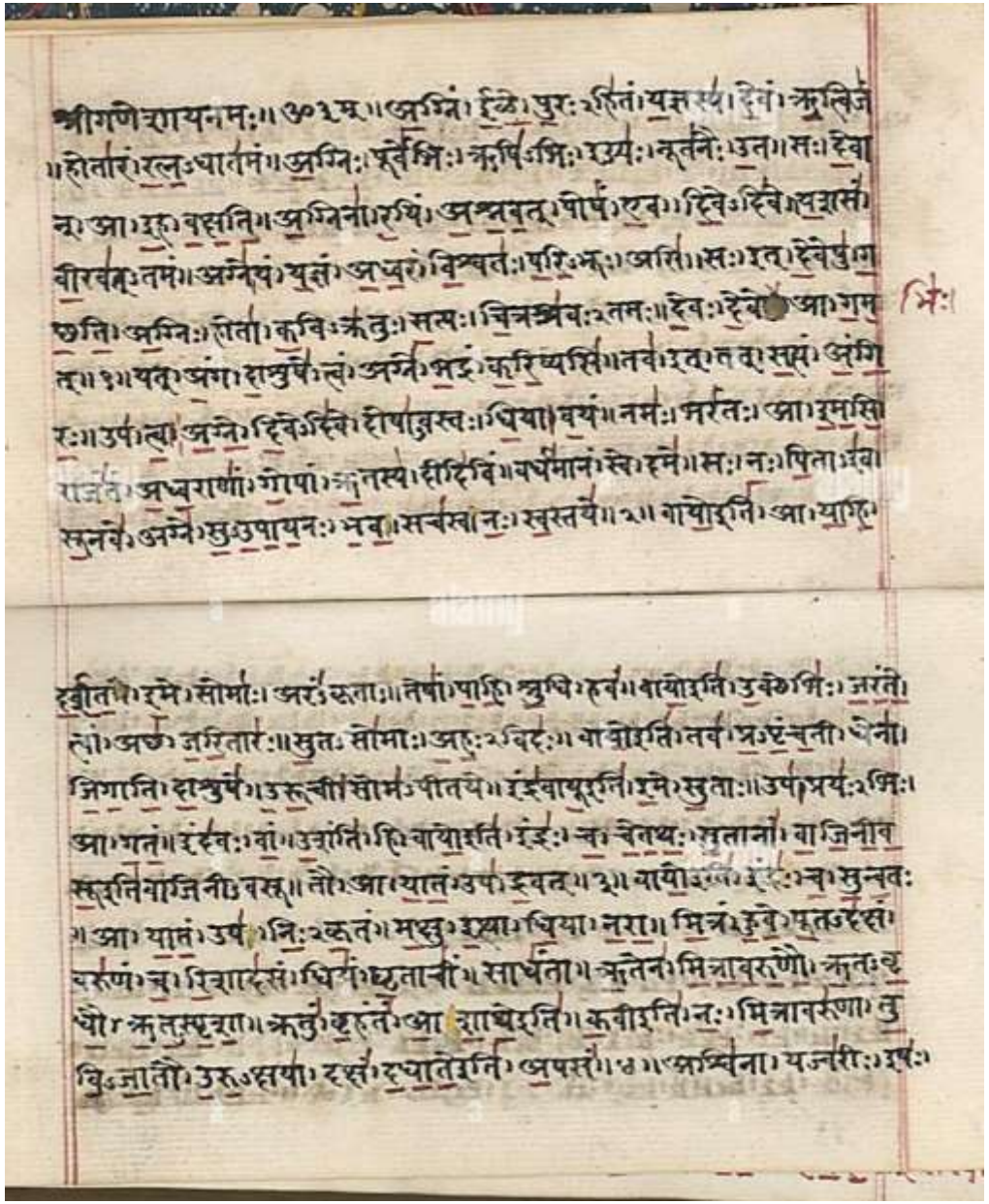
### PRACTICAL APPLICATION

Hands-on implementation of theoretical knowledge in real-world contexts and everyday practice.

- Healing techniques and treatments
- Construction methods
- Agricultural practices
- Artistic performances

# THE VEDIC CORPUS

- The Vedas are the oldest and most authoritative texts of ancient Indian tradition, forming the foundational of Hindu philosophy, religion, and culture.
- Composed in Vedic Sanskrit, these texts are considered 'Shruti'—that which is heard—implying a divine origin received by ancient sages (Rishis) through deep meditation.
- More than just religious doctrines, they encompass profound philosophical inquiries, complex ritualistic instructions, and a profound understanding of the universe, offering a timeless pursuit of truth and cosmic order.



# THE VEDIC CORPUS

## The Four Pillars of Knowledge

**RIGVEDA**

- **The oldest Veda, containing hymns (suktas) praising various deities.**
- **Focuses on cosmic creation and divine order (Rita).**
- **Foundation for later philosophical texts.**

**SAMAVEDA**

- **The Veda of melodies and chants.**
- **Verses mostly drawn from the Rigveda, set to musical notation.**
- **Crucial for correct chanting during soma rituals.**

**YAJURVEDA**

- **A prose compilation of ritual offerings and formulas.**
- **Serves as a manual for priests conducting complex sacrifices.**
- **Divided into 'Black' (unarranged) and 'White' (systematic) Yajurveda.**

**ATHARVAVEDA**

- **Later addition, focusing on everyday life, spells, and incantations.**
- **Addresses healing, protection, and societal rituals.**
- **Unique for its practical and socio-cultural insights.**

# Structural Divisions: The Vedic Strata

Each Veda is structurally divided into four distinct text types, reflecting a progression from ritualistic action to philosophical contemplation:

1. Samhitas: Mantras and benedictions.
2. Aranyakas: Texts on rituals, ceremonies, sacrifices, and symbolic sacrifices.
3. Brahmanas: Commentaries on rituals, ceremonies, and sacrifices.
4. Upanishads: Texts discussing meditation, philosophy, and spiritual knowledge.

Example: The Rigveda

- Samhita: The core 1,028 hymns praising deities like Agni and Indra.
- Brahmana: e.g., Aitareya Brahmana detailing the application of hymns in rituals.
- Aranyaka: e.g., Aitareya Aranyaka exploring the symbolic meaning behind the rituals.
- Upanishad: e.g., Aitareya Upanishad focusing on the nature of the self (Atman) and ultimate reality (Brahman).

# Timeless Wisdom: Core Teachings

- Cosmic Order (Rita): The universe is governed by an underlying moral and physical order that must be upheld through human action and ritual.
- Unity of Existence: Despite the multiplicity of deities, a fundamental unity underlies all existence—often expressed as "Truth is one, sages call it by various names."
- Karma and Dharma: The principles of cause and effect (Karma) and righteous duty (Dharma) are foundational to personal and societal well-being.
- Spiritual Liberation: The ultimate goal is the realization of the self (Atman) and its unity with the supreme reality (Brahman), leading to liberation (Moksha).

# The Six Vedangas: Limbs of the Vedas

To fully comprehend and properly utilize the Vedic texts, six auxiliary disciplines, known as Vedangas, were developed. They ensure proper pronunciation, interpretation, and ritual application.

**Siksa**
**(Phonetics)**
The study of precise pronunciation and articulation.

**Vyakarana**
**(Grammar)**
The rules of language and linguistic analysis.

**Nirukta**
**(Etymology)**
Explanation of complex Vedic words and meanings.

**Chandas**
**(Prosody)**
The study of poetic meters used in Vedic hymns.

**Kalpa**
**(Ritual)**
Detailed instructions for executing Vedic sacrifices.

**Jyotisa**
**(Astronomy)**
Calculation of auspicious times for rituals.

# The Vedic Corpus

## Siksa:
## The Science of Sound

Phonetics is critical because the efficacy of a Vedic mantra depends entirely on its correct pronunciation.

Siksa categorizes sounds based on their point of articulation (sthana), effort (prayatna), and duration (kala).

It ensures that the oral transmission of texts remains uncorrupted across millennia, treating sound itself as a sacred entity.

## Vyakarana:
## The Structure of Language

Grammar acts as the analytical tool to dissect and understand the language of the Vedas.

Scholars like Panini systemized Sanskrit grammar to preserve the original meaning of texts against linguistic drift.

By establishing strict rules for word formation and syntax, Vyakarana prevents misinterpretation of complex philosophical and ritualistic instructions.

# The Vedic Corpus

**NIRUKTA (Etymology)**

- Deals with the derivation and meaning of obscure or archaic words in the Vedas.
- Yaska's Nirukta is the seminal text, explaining how words are formed from basic verbal roots (dhatus).
- It moves beyond literal translation to uncover the symbolic and contextual significance of Vedic verses.

**CHANDAS (Prosody)**

- The study of poetic meters, dictating the rhythmic structure of mantras.
- Vedic hymns are composed in specific meters (like Gayatri, Trishtubh, Jagati), defined by the number of syllables per line.
- Proper meter is considered essential for the mantra's effectiveness, functioning as a mathematical framework for sacred sound.