



Minor Degree
in
Indian Knowledge System (IKS)



ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

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Minor Degree in Indian Knowledge System (IKS)

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AICTE has been making this effort for value-education and value-based education for value-based living since 2017. For this it has already placed in its Model Curriculum two mandatory culture inputs:

- Mandatory 3-week Student Induction Program for all newly joined students, which includes IKS-I: Introduction to Indian Culture and Civilization (with some present practices)
- IKS-II: Indian Culture and Civilisation with its Knowledge Systems and Traditions (a non-credit mandatory course for all students during 2nd semester)

In response to NEP 2020, AICTE has decided to additionally offer a minor degree in UHV

- **Minor Degree in IKS can be given for students who have completed the minimum credit requirement of 18 credits in IKS courses**
- The credits of the mandatory IKS courses (IKS-I and IKS-II) are to be counted in calculating the total IKS course credits
- The IKS courses mentioned in this document are to be offered as Open Electives

Following Open Electives/ Streamed Electives (Minors) in Indian Knowledge System are envisaged for the Minor Degree in IKS:

1. IKS III Vision for a Human Society (*Vishva Kalyan thru Vasudhaiva Kutumbkam*)*¹

2. IKS IV Indian Science, Engineering and Technology- Past, Present & Future*¹
3. IKS V Indian Town Planning and Architecture*¹
4. IKS VI Indian Mathematics and Astronomy*¹
5. IKS VII Indian Aesthetics (including Music & Musical Instruments)/ Arthashastra*¹
6. IKS VIII Indian Health, Wellness and Psychology- including Ayurved*¹

Faculty Preparation

These courses may initially be offered by the HSS department, but there is a need to have a separate multi-disciplinary IKS Cell to offer these IKS courses. This cell should be composed of faculty from all teaching departments, who take responsibility to teach these courses. Of course, faculty to mentor the students and to teach the various IKS courses have to be appropriately prepared.

These courses will be available in MOOC / other online or self-learning format for the time being.

Other Possible elective (minor) courses in IKS -

Indian System of Proof and Logic (including Nyay Shastra)
Indian Linguistics and Phonetics (including Panini's grammar, languages)
Indian Governance, Administration and Management Systems (including Arthshastra)
Indian Physics (e.g. Vaisheshik)
Textile Industry in India
Shipbuilding and Maritime Trade
Transport Systems in India
Principles and practice of Mechanics and Machines
Water Management in India
Ecology and Geography in India
Natural Agriculture and horticulture (e.g. vriksha ayurved) Practices in India
Indian Economics (Arthshastra)

Essential Preparation for each Course

Teaching-Learning Material
Syllabus*
PPT*
Video Recording of Lectures (MOOCs preferred) *
Text Book(s)*
Practice Exercises
Faculty Development Program(s)*
Prepared Faculty
Follow-up for further development of faculty
Internship and Research opportunities
Committed team for all of the above*

* Minimum preparation requirements

INDIAN KNOWLEDGE SYSTEM

***AICTE Model Curriculum for Open Elective/
Streamed Elective as Minor Degree for
Undergraduate degree courses***

List of IKS Courses (Mandatory, Open and Elective for Minor Degree) in IKS

	Mandatory Courses in UHV	Suggested Semester
1.	IKS-I: Indian Knowledge System-I – Introduction	Before 1 st Semester (part of SIP)
2.	IKS-II: Indian Knowledge System-II	1 or 2

	Open Electives/ Streamed Electives for Minor in UHV	Suggested Semester
1.	IKS III: Vision of Human Society <i>(Vishva Kalyan thru Vasudhaiva Kutumbkam)</i>	3
2.	IKS IV: Indian Science, Engineering & Technology (Past, Present & Future)	4
3.	IKS V: Indian Town Planning & Architecture	5
4.	IKS VI: Indian Mathematics & Astronomy	6
5.	IKS VII: Indian Aesthetics (including Music & Music Instruments)/ Arthashastra	7
6.	IKS VIII: Indian Health, Wellness and Psychology- including Ayurved	8

*The detailed materials for the marked courses are in the process of development, therefore, the provision for these courses can be made and they can be offered when materials are ready (within 1 year, i.e., by July 2022, the time when the course IKS-III will be offered in 3rd Semester).

The syllabus for courses being offered is given below:

IKS-I: Indian Knowledge Systems and Traditions

Syllabus

Course code	IKS- I			
Course title	Indian Knowledge Systems and Traditions			
Number of credit	Audit Course mandatory in SIP			
Course Category	IKS			
Semester	Before semester I			
Scheme and Credits	L	T	P	Credits
	0	0	0	Mandatory in SIP

Course Objectives

- To sensitize the students about context in which they are embedded i.e. Indian culture and civilisation including its Knowledge System and Tradition.
- To help student to understand the knowledge, art and creative practices, skills and values in ancient Indian system.
- To help to study the enriched scientific Indian heritage.
- To introduce the contribution from Ancient Indian system & tradition to modern science & Technology

Detailed contents:

[Total Theory Duration : 28 Lectures]

Module 1: Introduction to IKS [Duration: 8 Lectures]

(Any eight of total sessions assigned for Literary activity)

Introductory lecture on the **any eight** topics below:

1. Indian Knowledge System
2. Indian Culture & Civilization
3. Ancient Indian Chemistry
4. Ancient Indian Metallurgy
5. Ancient Indian Mathematics
6. Ancient Indian Astronomy
7. Indian Astronomical Instruments
8. Indian Knowledge System (Upveda: Ayurveda)
9. Indian Knowledge System (Upveda: Gandharveda)
10. Indian Knowledge System (Vedangas: Shiksha, Kalpa, Vyakrana)
11. Indian Knowledge System (Vedangas: Jyotisha, Nirukta, Chandas)
12. Indian Architecture I: Sthapatya-Veda
13. Indian Architecture II: Temples
14. Indian Architecture III: Town & Planning
15. Indian Philosophical System

Module 2: Introduction to Creative Practices [Duration: 20 Lectures]

(Twenty Lectures with at least Five different topics of total session under Creative activity)

Introductory lecture on the topics below:

1. Dhatuvada: art of metallurgy
2. Akara jnana: art of mineralogy
3. Vastuvidya: art of engineering
4. Yantramatrika: art of mechanics
5. Takshana: art of carpentry
6. Chalitakayoga: art of practicing as a builder of shrines
7. Raupyaratnapariksha: art of testing silver and jewels
8. Maniraga jnana: art of tinging jewels
9. Sucivayakarma: art of needleworks and weaving
10. Vadya vidya: art of playing on musical instruments
11. Geet vidya : art of singing
12. Nritya vidya: art of dancing
13. Natya vidya: art of theatricals
14. Alekhya vidya: art of painting
15. Viseshakacchedya vidya: art of painting the face and body with color
16. Uadakavadya: art of playing on music in water
17. Manasi kavyakriya: art of composing verse
18. Bhushanayojana: art of applying or setting ornaments
19. Citrasakapupabhakshyavikarakriya: art of preparing varieties of delicious food
20. Dasanavasanagaraga: art of applying preparations for cleansing the teeth, cloths and painting the body
21. Utsadana: art of healing or cleaning a person with perfumes
22. Vastragopana: art of concealment of cloths
23. Balakakridanaka: art of using children's toys
24. Tandulakusumabalivikara: art of preparing offerings from rice and flowers
25. Pushpastarana: art of making a covering of flowers for a bed

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1. Textbook on IKS by Prof. B Mahadevan, IIM Bengaluru
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3. The Cultural Heritage of India. Vol.I. Kolkata:Ramakrishna Mission Publication, 1972.
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6. Rao, N. 1970. The Four Values in Indian Philosophy and Culture. Mysore: University of Mysore.
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IKS-II: Indian Culture and Civilization

Syllabus

Course code	IKS- II			
Course title	Indian Culture and Civilization			
Number of credit	03			
Course Category	IKS			
Semester	II			
Scheme and Credits	L	T	P	Credits
	3	0	0	3

Course Objectives

- To introduce fundamentals of Ancient Indian Educations to understand the pattern and purpose of studying vedas, vedangas, upangas, upveda, purana & Itihasa
- To help students to trace, identify and develop the ancient knowledge systems.
- To help to understand the apparently rational, verifiable and universal solution from ancient Indian knowledge system for the holistic development of physical, mental and spiritual wellbeing
- To build in the learners a deep rooted pride in Indian knowledge, committed to universal human right, well-being and sustainable development.

Detailed contents:

[Total Theory Duration : 42 Lectures]

Module 1: Introduction to IKS [Duration: 8 Lectures]

Caturdaśa Vidyāsthānam, 64 Kalas, Shilpa Śāstra, Four Vedas, Vedāṅga, Indian Philosophical Systems, Vedic Schools of Philosophy (Sāṃkhya and Yoga, Nyaya and Vaiśeṣika, Pūrva-Mīmāṃsā and Vedānta), Non-Vedic schools of Philosophical Systems (Cārvāka, Buddhist, Jain), Puranas (Maha-puranas, Upa-Puranas and Sthala-Puranas), Itihasa (Ramayana, Mahabharata), Niti Sastras, Subhasitas

Module 2: Foundation concept for Science & Technology [Duration: 9 Lectures]

Linguistics & Phonetics in Sanskrit (panini's), Computational concepts in Astadhyayi Importance of Verbs, Role of Sanskrit in Natural Language Processing, Number System and Units of Measurement, concept of zero and its importance, Large numbers & their representation, Place Value of Numerals, Decimal System, Measurements for time, distance and weight, Unique approaches to represent numbers (Bhūta Saṃkhya System, Kaṭapayādi System), Pingala and the Binary system, Knowledge Pyramid, Prameya – A Vaiśeṣikan approach to physical reality, constituents of the physical reality, Pramāṇa, Saṃśaya

Module 3: Indian Mathematics & Astronomy in IKS [Duration: 9 Lectures]

Indian Mathematics, Great Mathematicians and their contributions, Arithmetic Operations, Geometry (Sulba Sutras, Aryabhatiya-bhasya), value of π , Trigonometry, Algebra, Chandah Sastra of Pingala,

Indian Astronomy, celestial coordinate system, Elements of the Indian Calendar Aryabhatiya and the Siddhantic Tradition Pancanga – The Indian Calendar System Astronomical Instruments (Yantras) Jantar Mantar or Raja Jai Singh Sawal.

Module 4: Indian Science & Technology in IKS [Duration: 8 Lectures]

Indian S & T Heritage ,sixty-four art forms and occupational skills (64 Kalas) Metals and Metalworking technology (Copper, Gold, Zinc, Mercury, Lead and Silver), Iron & Steel, Dyes and Painting Technology), Town & Planning Architecture in India, Temple Architecture, Vastu Sastra,

Module 5: Humanities & Social Sciences in IKS [Duration: 8 Lectures]

Health, Wellness & Psychology, Ayurveda Sleep and Food, Role of water in wellbeing Yoga way of life Indian approach to Psychology, the Triguna System Body-Mind-Intellect-Consciousness Complex. Governance, Public Administration & Management reference to ramayana, Artha Sastra, Kautilyan State

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15. Chatterjee, S.C. The Nyaya Theory of Knowledge. Calcutta: University of Calcutta Press, 1950.
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19. Hume, Robert Ernest, Tr. *The Thirteen Principal Upanishads*. Virginia: Oxford University Press, 1931.
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21. Satprakashananda. *The Methods of Knowledge according to Advaita Vedanta*. Calcutta: Advaita Ashram, 2005.
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IKS-III: Indian Vision for Human Society (Vishva Kalyan thru Vasudhaiva Kutumbkam)

Syllabus

Course code	IKS- III			
Course title	Indian Vision for Human Society (<i>Vishva Kalyan thru Vasudhaiva Kutumbkam</i>)			
Number of credit	03			
Course Category	IKS			
Semester	III			
Scheme and Credits	L	T	P	Credits
	3	0	0	3

Course Objectives

- To help the learner to understand the concept of “vasudhaiva kutumbkam” and its realization process as an base for the development of vision for a humane society.
- To help to identify the universality in humans and its coexistence in existence
- To introduce the sense of responsibility, duties and participation of individual for establishment of fearless society.
- To help to understand the apparently rational, verifiable and universal solution from ancient Indian knowledge system for the holistic development of physical, mental and spiritual wellbeing of one and all, at the level of individual, society, nation and ultimately the whole world.

Detailed contents:

[Total Theory Duration : 42 Lectures]

Module 1: The world view & Vision of Human Society [Duration: 8 Lectures]

The concept of non-duality of Prakriti (Jad) and Purush (Chetana), human as coexistence of Jad & Chetan, Pancha-mahabhutas, the root of sorrow and suffering, freedom from sorrow, salvation, eternal peace truth (vyaharika satya), ultimate truth. The acceptance of various systems of philosophy for realization of truth and complementariness in society in ancient Indian system.

Module 2: Aspiration and Purpouse of Individual and Human Society [Duration: 8 Lectures]

Aims of Human life; at individual level and societal level. At societal level; Four purusarthas Dharma, Artha, Kama, Moksha. Individual level; Abhyudaya (progress),

Nihshreyasa (perfection) Pravrtti , Nivrtti. Dharma; Dharma sutras (Gautama, apastamba, baudhayana, vasistha). Dharma-Shastra; (manusmriti, naradamrti, visnumrti, yajnavalkya smriti) sociology, different stages of life like studenthood, householdership, retirement and renunciation, rites and duties, judicial matters, and personal laws (Aachara, Vyavahara, Prayaschitta). Artha; Kautliya Arthashastra, Kamandakiya Nitisara, Brihaspati Sutra, Sukra Niti, Moksha: Human liberation (Ignorance to Knowledge)

Module 3: Program for Ensuring Human Purpose: at Individual and Societal level - I [Duration: 8 Lectures]

Fundamental concept of Nitishastra: Satyanishtha Aur Abhiruchi (Ethics, Integrity & aptitude). The true nature of self; Shiksha Valli, Bhrigu Valli (concept of Atman-Brahman (self, soul). The true constitution of Human: Ananda Valli (Annamaya Kosha, Pranamaya Kosha, Manomaya Kosha, Vijnanamaya Kosha, Anandamaya Kosha). The four states of consciousness (Waking state, Dreaming state, Deep Sleep State, Turiya the fourth state), Consciousness (seven limbs and nineteen mouths), Prajna, Awareness. The Life Force *Prana* (Praana-Apaana-Vyaana-Udaana- Samaana)

Module 4: Program for Ensuring Human Purpose: at Individual and Societal level - II [Duration: 8 Lectures]

Differentiating *Vidya* and *Avidya*, human bondages, Higher and Lower Knowledge (Para Vidhya & Apar Vidhya). Concept of Sattva, Rajas, Tamas and need of balancing the same, Patanjali yog sutra; Yama, Niyama, Asanas, pranayams, pratyahara, dharna, dhyana, Samadhi, Sixteen category of padartha, pramans (pratyaksh, anumana, upamana, shabda). Saadhana chatustayam (viveka, vairagya, mumukshatavam, shadsampathi (sama, dama, uparama, titiksha, shraddha, samadhana), Understanding Nitya karma, Naimittika Karma, Kamy karma, prayaschitta karma, Nishidha Karma.

Meditation and Progressive meditation (Narada's education), Ativadin to self-knowledge, Jyan yog, Karma yog, sanyas yog in aspect to harmonious practice in society

Module 5: Practices for Ensuring Human Purpose – III [Duration: 10 Lectures]

Practice in philosophy, architecture, grammar, mathematics, astronomy, metrics, sociology, economy and polity, ethics, geography, logic, military science, weaponry, agriculture, mining, trade and commerce, metallurgy, shipbuilding, medicine, poetics, biology and veterinary science.

References:

1. Maharaj swami chidatmanjee, Ancient Indian Society, Anmol publication pt ltd, indi
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23. J Auboyer, *Daily Life in Ancient India from Approximately 200 BC to AD 700*, Munshi ram Manoharlal publication, 1994.
24. DK Chakkrabarty, Makkhan Lal, *History of Ancient India (Set of 5 Volumes)*, Aryan book Internation publication, 2014
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29. Dasgupta, Surendra. *A History of Indian Philosophy*. Delhi: Motilal Banarsidass, 1991. Vols. III & IV.
30. Mercier, Jean L. *From the Upanishads to Aurobindo*. Bangalore: Asian Trading Corporation, 2001.

IKS-IV: Indian Science, Engineering and Technology (Past, Present and Future)

Syllabus

Course code	IKS- IV			
Course title	Indian Science, Engineering and Technology (Past, Present and Future)			
Number of credit	03			
Course Category	IKS			
Semester	IV			
Scheme and Credits	L	T	P	Credits
	3	0	0	3

Course Objectives

- To familiarize learners with major sequential development in Indian science, engineering and technology.
- 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
- To help to understand the apparently rational, verifiable and universal solution from ancient Indian knowledge system for the scientific, technological and holistic development of physical, mental and spiritual wellbeing.

Detailed contents:

[Total Theory Duration : 42 Lectures]

Module 1: Indian Traditional Knowledge; Science and Practices [Duration: 8 Lectures]

Introduction to the Science and way of doing science and research in India, Ancient Science in Intra & Inter Culture Dialogue & coevolution.

Traditional agricultural practices, Traditional water-harvesting practices, Traditional Livestock and veterinary Sciences Traditional Houses & villages, Traditional Forecasting, Traditional Ayurveda & plant based medicine, Traditional writing Technology

Module 2: Ancient Indian Science (Physics, Chemistry, Maths) [Duration: 9 Lectures]

Physics in India: Vaisheshika darshan Atomic theory & law of motion, theory of panchmahabhoota, Brihath Shathaka (divisions of the time, unit of distance), bhaskarachaya (theory of gravity, surya siddhanta & sidhanta shriomani), Lilavati (gurutvakashan Shakti).

Chemistry in India Vatsyayana, Nagarjuna, Khanda, Al-Biruni, Vagbhaṭa –building of the ras-shala (laboratory), working arrangements of ras-shala, material and equipment, Yaśodhara Bhaṭṭa-process of distillation, apparatus, saranasamskara, saranataila

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

Module 3: Ancient Indian Science (metallurgy, Astronomy, Architecture) [Duration: 9 Lectures]

Metallurgy in India: Survarṇa(gold) and its different types, prosperities, Rajata(silver), Tamra(copper), Loha(iron), Vanga(tin), Naga / sisa(lead), Pittala(brass)

Astronomy in India Vedang Jyotish, aryabhata siddhanta, Mahabhaskriya, Laghubhaskariya, vatesvarasiddhanta, Sisyadhivrddhida, Grahashyay, Goladhyaya, Karabakutuhala (Aryabhata, Varahamihira, Brahmagupta, Vaṭesvara, Bhaskara, Paramesvara, NilakanṭhaSomayaji, Jyēṣṭhadeva, ŚankaraVarman)

Architecture in India: Nagara (northern style), Vesara (mixed style), and Dravida (southern style), Indian vernacular architecture, Temple style, cave architecture, rock cut architecture, kalinga architecture, chandels architecture, rajput architecture, jain architecture, sikh architecture, Maratha architecture Indo-Islamic architectural, Indo-Saracenic revival architecture, Greco Buddhist style.

Module 4: Ancient Indian Science (Textile, Agriculture, Transport) [Duration: 9 Lectures]

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: 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

Module 5: Ancient Indian Science (Ayurveda & Yoga) [Duration: 7 Lectures]

Ayurveda for Life, Health and Well-being: Introduction to Ayurveda: understanding Human body and Pancha maha bhuta, the communication between body & mind, health

regimen for wellbeing, introduction to yoga (raja yoga, astang yoga, gyan yoga), understanding of Indian psychological concept, consciousness, tridosha & triguna.

References:

1. Textbook on IKS by Prof. B Mahadevan, IIM Bengaluru.
2. Kapur K and Singh A.K (Eds) 2005). Indian Knowledge Systems, Vol. 1. Indian Institute of Advanced Study, Shimla. Tatvabodh of sankaracharya, Central chinmay mission trust, Bombay, 1995.
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IKS-V: Indian Town Planning and Architecture

Syllabus

Course code	IKS- V			
Course title	Indian Town Planning and Architecture			
Number of credit	03			
Course Category	IKS			
Semester	V			
Scheme and Credits	L	T	P	Credits
	3	0	0	3

Course Objectives

- To develop the knowledge and analysis on the understanding of eco-friendly, robust and scientific planning and architecture system of ancient India.
- To understand the importance of functional, aesthetic, psychological, culture and socio religious concept of ancient India architecture.
- To help the learners to trace, identify and develop the approach, process and material used in town and planning, construction and architecture
- To review and analyse the importance and significance of visual and performing arts and design in temples, houses, forts, caves and community places.
- To understand the various eco-friendly technology accepted in ancient civilization

Detailed contents:

[Total Theory Duration : 42 Lectures]

Module 1: The Introduction to ancient Architecture [Duration: 6 Lectures]

Introduction to relationship between Man, Nature, Culture and city forms. Study of determinants (Natural and man-made) influencing location, growth & pattern of human settlements including types of settlements growth (Organic and Planned) and settlement forms.

Architecture as satisfying human needs: functional, aesthetic and psychological outline of components and aspects of architectural form-site, structure, skin, materials, services, use, circulation, expression, character, experience.

Understanding of the causative forces - the cultures, history, socio religious practices and institution, political and economic conditions, issues of land, climate and technology, Historical and Primitive Architecture.

Module 2: Ancient Architecture as Expression of Art & Design [Duration: 10 Lectures]

Relationship between Art and Design with man, space and environment. Expression in Art and Architecture – concept of space, sense of enclosure-openness, robustness, dynamism, spatial geometry, Eco-friendliness.

Architecture through use of elements of visual arts such as point, line, plane, form, space, colour, texture, light, solids and voids, shadow and shade etc. Understanding of effect of scale, proportions, order, material effects such as textures, patterns, light, sound, temperature etc in architectural spaces.

Allied visual and performing arts and its relationship to build environments using colour theory, symbolism, glass painting, scriptural writing, clay moulding, stone carving.

Important Indian architecture as per elements space & form **Form:** specific geometry form (sphere, cube, pyramid, cylinder and cone and its sections as well as their derivatives) **Space:** build form space, open space, Internal and External space, Continuous spaces Centralized, Linear, Radial Clustered, Grid space

Different type of Materials used for construction in Ancient Indian architecture.

Clay products: Classification of bricks, Fire Brick, Fly Ash Bricks, Tiles, Terra-cotta, Earthenware, Porcelain, Stoneware. **Stones:** Uses of Stones, Qualities of Good Building Stones, Dressing, Common Building Stones of India. **Glass:** Different glass Forms and their Suitability, **Timber:** Different Forms and their Suitability **Metals:** Ferrous & Nonferrous Metals and Alloys, and, their Suitability, limitations, precautions **Paints and Varnishes:** Different types and their Suitability, limitations, precautions

Module 3: Ancient Architecture Principle & Planning [Duration: 8 Lectures]

Design: Principles of designing – Composition of Plan. Inception and development of the early Hindu temple form with reference to Vedic and Buddhist planning principles and design elements; Development of regional styles and manifestations thereof; Evolution of temple complexes and temple towns;

Planning: Residence- site selection, site orientation- aspect, prospect, grouping, circulation, privacy, furniture requirements, services and other factors. Vastu shastra and its importance in building interrelationship with human, nature and cosmos

Town Planning: Town plans of Harappa, Mohenjodaro, Pataliputra, Delhi. Vastu shastra and its application in city layout.

Module 4: Ancient Architecture-I [Duration: 10 Lectures]

The settlement planning pattern, elements, associated forms, typical Vedic village, towns (Dandaka, Nandyavarta etc.), typology of Shelters and civic buildings of ancient

architecture in reference to following civilization: Indus Valley, Aryan/vedic Civilisation, Buddhist Architecture, Indo Aryan & Dravidian Architecture.

Role of Shilpasasthras and Arthashashtra in settlement planning.

Important architecture: Great baths, Development of fortification, walled towns, structures developed eg: Stupas, Viharas, Chaityas, Stambhas, Toranas, sacred railing etc.

Study of worshipping places with especial reference to Indo Aryan / Nagara style & Dravidian style (Chola, Chalukya, Pallava, Satavahana, Hoysala, Vijayanagara etc.), design of shikharas & gopuram, rock-cut and structural examples of temples.

Module 5: Ancient Architecture-II [Duration: 8 Lectures]

Evolution of Hindu Temples in different period: Gupta, Aihole, Badami, Pattadakal, Mahabalipuram, Indo Aryan Style in Orrisa, Khajuraho, Gujarat, Rajasthan. Dravidian Style in Chola, Chalukyan, Pandya, Pallava, Hoysala Style, Revival of Hindu architecture of South India at Vijaynagara and Madurai

Tradition Indian villages & House: Regional house construction, interior & importance e.g. Rajasthani house, bhungas of kutch, nalukettu of kerala, Ikra of assam, manduva logili or illu of Andra Pradesh, wadas of Maharashtra, Mud houses of Madhya Pradesh, kathkuni of himachal Pradesh, khanjaghara of orisa, Taq and dhajji diwari of Kashmir etc.

Scientific achievements though ancient architect: Jantar Mantar, Musical Pillars of Vitthal temple, Sundial of konark temple, construction of eight shiva temple in straight line from Kedarnath to rameshwaram at longitude 79°E 41'54, Veerbhadra temple with 70 hanging pillars, Ellora caves excavating the mountain, Jaipur plan pink city etc.

References:

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3. Nair, Shantha N. Echoes of Ancient Indian Wisdom. New Delhi: Hindology Books, 2008.
4. Dr. V. Ganapati Sthapati, Building Architecture of Sthapatya Veda
5. Binode Behari Dutt, Town planning in ancient India, Life Span Publishers & Distributors
6. NR Dave, A Study of The Hindu Science of Architecture and its Practice with Special Reference to Rajavallabha, Bharti vaidhya Bhavan , 2011
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8. D N Shukla Civil Architecture in Ancient India (Part-I) Meharchand lakshmidas publication, 2016.
9. S Maheshwari, R Garg, Ancient Indian Architecture, CBS publisher, 2001
10. B Dagens, Mayamata: An Indian Treatise on Housing Architecture and Iconography (An Updated Edition with revised Glossary), Motilal banrsidas, 2017
11. V K Bansal, Maha Vastu, Om Book Internation 2011

12. SS Das, The Miracles of Vaastu Shastra, pustak mahal, delhi, 2013,
13. Anant Shashikala, The Penguin Guide to Vaastu, the classical Indian science of architecture & design, penguin India, 2000

IKS-VI: Indian Mathematics and Astronomy

Syllabus

Course code	IKS- VI			
Course title	Indian Mathematics and Astronomy			
Number of credit	03			
Course Category	IKS			
Semester	VI			
Scheme and Credits	L	T	P	Credits
	3	0	0	3

Course Objectives

- To provide information about great mathematicians and astronomers who given significant contribution in Indian mathematics and astronomy.
- To help students to trace, identify, practice and develop the significant Indian mathematic and astronomical knowledge.
- To help to understand the astronomic significance with the human holistic development of physical, mental and spiritual wellbeing
- Enumerate the main characteristics of education system in Vedic and post Vedic period to enrich the intellectual imagination and diminish the dogmatic assurance which closes the mind against speculation

Detailed contents:

[Total Theory Duration : 42 Lectures]

Module 1: The Introduction to Ancient Mathematics & Astronomy [Duration: 6 Lectures]

Introduction to Brief introduction of inception of Mathematics & Astronomy from vedic periods. Details of different authors who has given mathematical & astronomical sutra (e.g. arytabhata, bhaskara, brahmagupta, varamahira, budhyana, yajanvlkya, panini, pingala,

bharat muni, sripati, mahaviracharya, madhava, Nilakantha somyaji, jyeshthadeva, bhaskara-II, shridhara)

Periodical enlisting of Mathematical & Astrological achievement in India. Evolution of Indian Numerals (Brahmi (1st century), Gupta (4th century) & Devanagri Script (11th century)

Module 2: Ancient Mathematics –I [Duration: 9 Lectures]

Veda & Sulvasutras (Pythagoras theorem, Square root & Squaring Circle) (baudhayana sulbhasutra, apastamba sulbhasutra, katyayana sulbhasutra, manava sulbhasutra, maitrayana sulbhasutra, varaha sulbhasutra, vadhula sulbhasutra

Pingala's chandasutras, sunya, yaat-tavat, Aryabhata (Aryabhatiya, Asanna, ardha-jya, kuttaka,), bhaskara (trigonometry,shridhara, mahavira), Bhaskara Acharya (Sidhantashiromani), Varamahira panchasiddhantika.

Module 3: Ancient Mathematics –II [Duration: 9 Lectures]

Brahmagupta (vargaprakrati, bhramasphuta siddhanta, bhavana), ayatavrta, ganitasarasamgraha, lilavathi, ganesadaivajna, randavantika, suryasiddhanta, grahalaghava, sadratnamala, mandavrta, sigrharta, Bijaganita, Bakshali manuscript

Golavada, Madhyamanayanaprakara, Mahajyanayanaprakara (Method of Computing Great Sines), Lagnaprakara, Venvaroha, Sphutacandrapti, Aganita-grahacara , Chandravakyani (Table of Moon-mnemonics)

Module 4: Ancient Astronomy –I [Duration: 9 Lectures]

Parahita system of astronomy and drk system of astronomy, Manda samskara, sikhra samskara.

Vedanga Jyotisha (astronomical calculations, calendrical studies, and establishes rules for empirical observation), Aryabhatiya (earth rotation, shining of moon), Brahmasphutasiddhanta (motion of planets), varahmihira (pancasiddhantika), Mahabhaskariya, lahubbhaskariya & aryabhatiya bhashya (Planetary longitudes, heliacal rising and setting of the planets, conjunctions among the planets and stars, solar and lunar eclipses, and the phases of the Moon), Sisyadhiveddhida (grahadyaya, goladyaya), siddhantashiromani, karanakutuhala (planetary positions, conjunctions, eclipses, cosmography), siddhantasekhara, yantra-kirnavali, Sphutanirṇaya, Uparagakriyakrama.

Module 5: Ancient Astronomy –II [Duration: 9 Lectures]

Positional astronomy (sun, planets, moon, coordinate systems, precision of the equinox and its effects, eclipses, comets and meteors), Mahayuga & Kalpa system Yuga system, ayanas, months, tithis and seasons, time units, sun and moon's motion, planet position, ayanachalana, zero-precision year, katapayaadi system, Indian nakshatra system, astronomy

Instruments for naked eye astronomy (vedic observatories). The principal and application of Samrat Yantra, Jai Prakash Yantra, Disha Yantra, Rama Yantra, Chakra Yantra, Rashiwalya Yantra, Dingash Yantra, Utaansh Yantra

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10. BS Yadav, Ancient Indian Leaps into Mathematics, brikausher publication, 2010
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12. BV subbarayappa, The Tradition of Astronomy in India: History of Science, Philosophy and Culture in Indian Civilization Vol. IV, Part 4: Jyotihsastra (History of Science, Philosophy & Culture in Indian Civilization), centre for studies in civilization, 2008
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IKS-VII: Indian Aesthetics (including Music and Music Instruments)

Syllabus

Course code	IKS- VII			
Course title	Indian Aesthetics (including Music and Music Instruments)			
Number of credit	03			
Course Category	IKS			
Semester	VII			
Scheme and Credits	L	T	P	Credits
	3	0	0	3

Course Objectives

- To provide information about the foundations of Indian aesthetics as integral part of Indian culture
- To help to understand the importance of Indian aesthetics in individual realization of the truth arises by realizing the harmony within.
- To help learner to trace, identify and develop the Indian aesthetics to correlate human creative practices
- To build the learners a deep rooted pride in Indian aesthetic knowledge, committed to universal human right, well-being and sustainable development.

Detailed contents:

[Total Theory Duration : 42 Lectures]

Module 1: The Introduction to Indian Aesthetics [Duration: 5 Lectures]

The nature of aesthetics, principle, its relation to philosophy and literature: Indian traditions. Sadanga its origin and Applications of Six limbs in Indian Aesthetics Introduction to Alamkara, Rasa, Dhvani, Vakrokti, Auchitya

Module 2: Ancient Music and Music Instruments-I [Duration: 10 Lectures]

Rasa Siddhanta, the concept of Rasa, constituent of rasa (Bhav, abhinay, Sthayibhava, Vibhava, Vyabhicharibhava), number of rasa, Rasasvadana Bharata's Natya Shastra and its Critics, Abhinavagupta's Rasa Siddhanta., Kāvyaaprayojana, Sādhāranikarana, Sahrdaya, Rasavighna.

DhvaniSiddhanta, the Concept of Dhvani, Sphota, Pratibhā, classification of dhvani (Laukika Vyangya, Alaukika Vyangya, Avivaksita Vacya, Vivaksitanyapara Vacya) Anandavardana's Dhanyaloka, with reference to Abhidha, lakshana, Vyanjana and Tatpary, extension of dhvani siddhanta to music, dance and drama.

Alamkara Siddhanta, proponent, classification of alamkara, sabdalamkara (Anuprāsa, Yamaka, Ślesha, Dhvanyātmakatā), Arthālamkāra (Upamā, Drstanta, Virodha)

Module 3: Ancient Music and Music Instruments-II [Duration: 12 Lectures]

VakroktiSiddhanta, Kuntaka's Vakroktijivita, Classification of Vakrokti (Varna-vinyasa vakrata (Phonetic Obliquity), Pada-purvardha vakrata (Lexical Obliquity) & Pada-parardha vakrata (Grammatical Obliquity), Vakya-vakrata (Sentential obliquity), Prakarana-vakrata (Episodic obliquity), Prabandha-vakrata (Compositional obliquity))

Different Classes of Musical Instrument as per Natyashastra of Bharat, Gana Vadya, Avanaddha Vadya, sushira vadya, tata/tantu vadya.

Brief introduction to following indian instruments

Veena, Ghatam, Gootuvadhyam, Flute, Thavil, Nadaswaram, Mridangam, Plain-drum, Harmonium, Sitar, Sarod, Shehnai, Tabla, Maddalam, violin, morsing, Tambura.

Module 4: Ancient Dance & Drama [Duration: 8 Lectures]

Natyaveda: inception from Veda (pathya words(rigveda), abhinaya gestures (Yajureda), geet music (samaveda), rasa emotions (atharvaveda), Natya Shastra, Nata-nritya, geet-nritya, roop-nritya, bhav-nritya

Indian traditional and folk dances (bharatnatyam, kuchipudi, kathakali, yakshagan, Bhangra, Bihu, Ghumura Dance, Sambalpuri, Chhau and Garba

Module 5: Ancient Art [Duration: 7 Lectures]

Architecture, sculptures & popular art forms of Pallava& Cholas period, Chalukya & Rastrakuta period, Chandela/Hosalya period, Rajput period. Rock cut architecture, cave architecture, stupa, temples, sculpture

Hindu Shilpa texts as per Vishnudharmotara-puran, Samaranana, Sutracharana, Sukranitisara, Silparatham

Reference:

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17. Samita Redday, Ancient Indian Music, cyber Tech Publications, 2018.

IKS-VIII: Indian Health, Wellness and Psychology (including Ayurved)

Syllabus

Course code	IKS- VIII			
Course title	Indian Health, Wellness and Psychology (including Ayurved)			
Number of credit	03			
Course Category	IKS			
Semester	VIII			
Scheme and Credits	L	T	P	Credits
	3	0	0	3

Course Objectives

- Understanding the fundamental principles of Indian health systems such as Ayurveda and yoga which are useful in maintaining the health of a healthy person
- Practical implementation of health principles to correct the intake of our food, air, water and sunlight to achieve perfect health.
- Understanding traditional way of cleansing the body regularly, strengthening body with Yogic exercises, maintaining the internal balance to prevent diseases.
- Understanding our unique Mind Body Constitution and choosing the right lifestyle suitable to maintain the internal balance.

- Understanding the influence of external environment on internal health and ways to synchronise our body and mind with nature to ensure smooth functioning of all organ systems of our body.
- Understanding mind and its dynamics through knowledge of Ayurveda and Yoga and using the knowledge to maintain harmony between body and mind to achieve perfect mental health.

Detailed contents:

[Total Theory Duration : 42 Lectures]

Module 1: Understanding human body [Duration: 8 Lectures]

Introduction to Ayurveda, the Knowledge of Life, Health and treatment aspects in Ayurveda, Influence of Pancha maha bhuta on Internal environment of Human being, Understanding composition of Human body through the concept of Dosha Dhatu Mala, Understanding Prakruthi , the Mind – Body Constitution.

Module 2: Understanding the communication between body & Mind [Duration: 8 Lectures]

Establishing communication between body and mind by understanding the language of body. Understanding the concept of Agni, Koshta, Sara and Ojas and their relevance in enhancing our immunity to protect from various infections. Looking at the world through the lenses of Dravya, Guna and Karma Applying the principle of Samanya and Vishesha in every aspect of life to achieve perfect health.

Module 3: Introduction to Health Regimen [Duration: 12 Lectures]

Understanding Swastha vritta, the healthy regimen to maintain state of wellbeing Dinacharya, the Daily regimen including Daily detoxification, exercise, Intake of Food, Water, Air and Sunlight, work and ergonomics, Rest and sleep hygiene. Ritu charya, the seasonal regimen, Sadvritta and the concept of social wellbeing, understanding trividha upastambhas, three pillars to health, Concept of Shadrasa in choosing appropriate nourishment to the body and mind.

Module 4: Introduction to Yoga [Duration: 07 Lectures]

Definition, Meaning and objectives of Yoga, Relevance of yoga in modern age. Brief Introduction of Hatha yoga, Raja yoga, Karma yoga, Gyana Yoga, Bhakti yoga Understanding eight steps of Ashtanga yoga, Understanding Shatkriyas , the six cleansing procedures of Yoga

Module 5: Introduction to Indian Psychology [Duration: 07 Lectures]

Concept of Manas in Ayurveda and understanding Mind Body harmony, Triguna based Psychology in Ayurveda and Yoga, Influence of Tri dosha on Mind, Mind body intellect and consciousness complex, Understanding Consciousness and solution to issues within Human Mind.

Reference:

1. The Charaka Samhita
2. The Susruta Samhita
3. Teh Ashtanga Hridaya
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