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SCHOOL OF INTERNATIONAL STUDIES
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जवाहरलाल नेहरू विश्वविद्यालय
JAWAHARLAL NEHRU UNIVERSITY
अंतरराष्ट्रीय अध्ययन संस्थान
SCHOOL OF INTERNATIONAL STUDIES

Programme:	B.A.
Course No:	101 CP
Course Title:	Understanding Indian Knowledge Systems & Scientific Traditions
Course Type:	Optional
Semester:	Monsoon
Course Teacher & Contact Details:	Name: Dr Sabareesh.P.A, Assistant Professor. Room no: #129, CCPPT, First Floor, SIS-1, JNU Email: sabareesh.jnu@gmail.com ; sabareesh@jnu.ac.in
Credits:	4
Contact Hours:	4 hours / week

Course Statement

The course provides with an introduction to the undergraduate students on the historic evolution of scientific ideas, knowledge traditions and the intellectual practices in India since the ancient times from a civilizational perspective and socio-political viewpoint. The course would not be technically focusing on science or history, but adopts the lens or viewpoint to see science as a part of culture, society, ethics, governance and inter-civilizational interactions leading to knowledge sharing, relationship building and wealth generation. It shall familiarize students with India's diverse traditions of knowledge production in the areas of mathematics, medicine, astronomy, metallurgy, education and other areas of knowledge. At the same time the course shall also examine their social linkages, foundations and their global links.

The course highlights the transition of indigenous education traditions during colonialism, the emergence of science and nationalism, and the important steps India took towards self-reliance and modernization after independence. The course simplifies complex scientific and philosophical concepts through case studies, examples discussions and inter-disciplinary analysis. The course hence aims to cultivate in the learners the important understanding of science as a civilizational pursuit and process that is deeply connected to society, identity, culture and global engagement.

Course Objectives

1. To understand science as a socio-political institution and civilizational force.
2. To interpret India's scientific traditions from an IKS perspective
3. To examine disruptions during colonialism and postcolonial recovery.
4. To introduce and interpret science diplomacy and technological sovereignty from social, cultural, political and economic perspectives.

Learning Outcomes

Knowledge gained:

- Basic understanding that science and technology are a part of social progress that forms the basis of Indian Knowledge Systems.
- Understanding that scientific progress has political, military and economic repercussions.

Skill gained:

- Analyze science diplomacy in geopolitics.
- Explain science as a civilizational and political process.

Competency gained:

- Differentiate differences between Indian Knowledge Systems and colonial knowledge.
- Evaluate the process of decolonization of knowledge systems.

Evaluation Methods

1. Mid semester evaluation (50%)

- Internal Assignment – 30%
- Examination – 20%

2. End-semester evaluation (50%)

- End Semester Examination – 50 %

Course Outline

Module 1: Science and Society in Indian Civilization

1. Science as a socio-cultural and historical process
2. Knowledge traditions in Indian civilization
3. Science and governance in ancient India
4. Science, technology and development

Module 2: Traditions of Indian Knowledge System, Scientific Practices and Achievements

1. Oral traditions and transmission of knowledge
2. Interdisciplinary nature of Indian sciences
3. Achievements in mathematics and astronomy, medicine and healing traditions, metallurgy and material sciences, ecology and environmental knowledge
4. Understanding knowledge generation as a civilizational pursuit

Module 3: India and the Circulation of Knowledge Across Civilizations

1. Trade, knowledge exchange and transmission from ancient **India → Arabia → Europe**
2. Case studies on India's contribution to global knowledge systems
3. Understanding knowledge diffusion through travelogues.
4. Science and mobility of ideas

Module 4: Science, Ethics, Dharma and Education in India

1. Dharma as the base and foundation for ethical knowledge production
2. Moksha (liberation/ enlightenment) as the goal for attaining knowledge
3. Gurukulas, ashrams, patshalas, matts, temples, viharas, Nalanda, Takshashila, Vikramshila etc. as indigenous education models and institutions
4. Spirit of swadeshi sciences

Module 5: Colonialism, Intellectual Imperialism and Scientific Change

1. Colonial interventions in education and knowledge systems
2. Science as a colonial tool of knowledge suppression and supremacy assertion
3. Science, nationalism, self-reliance and technological development & sovereignty
4. India's scientific institutions after independence

Readings

Module 1: Science and Society in Indian Civilization

Essential Readings:

1. Basalla, G. (1967). *The Spread of Western Science*. *Science*, 156(3775), 611–622.
<https://doi.org/10.1126/science.156.3775.611>
2. Bernal, J. D. (1969). *Science in History* (Vols. 1–4). MIT Press. <https://mitpress.mit.edu>
3. Durant, W. (1954). *Our Oriental Heritage* (The Story of Civilization, Vol. 1). Simon and Schuster. <https://archive.org/details/in.gov.ignca.21085>
4. Joseph, G. G. (2011). *The Crest of the Peacock: Non-European Roots of Mathematics*. Princeton University Press. <https://press.princeton.edu/books/paperback/9780691135267>

5. Needham, J. (1954). *Science and Civilization in China* (Vol. 1). Cambridge University Press. <https://www.cambridge.org/core/books/science-and-civilisation-in-china/>
6. Sabareesh, P. A. (2021). *A Brief History of Science in India*. Garuda Prakashan. <https://garudabooks.com>
7. Sabareesh, P. A., & Sony, A. L. R. (2022). *Science and Knowledge as a Tool of Subjugation: Perspectives of European colonialism in India*. *Journal of Scientific Temper*, 10(3), 177–190. <https://nopr.niscpr.res.in/index.php/JST/article/view/59793/465481585>
8. Sivin, N. (1995). *Science in Ancient China: Researches and Reflections*. Variorum. <https://www.routledge.com>

Additional Readings:

1. Alatas, S. F. (2006). *Alternative Discourses in Asian Social Science: Responses to Eurocentrism*. SAGE Publications. <https://in.sagepub.com>
2. Bala, A. (2012). *The Dialogue of Civilizations in the Birth of Modern Science*. Palgrave Macmillan. <https://link.springer.com/book/10.1057/9781137031730>
3. Clark P, O'Hear A. *Popper on Determinism*. In: *Karl Popper: Philosophy and Problems*. Royal Institute of Philosophy Supplements. Cambridge University Press; 1996:149-162. <https://www.cambridge.org/core/books/abs/karl-popper/popper-on-determinism/8684F79D91F0F384B543491D4F07EDF4>
4. Habib, I. (2011). *Medieval India: The Study of a Civilization*. National Book Trust. <https://www.nbtindia.gov.in>
5. Hobson, J. M. (2004). *The Eastern Origins of Western Civilization*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511483509>
6. Krige, J. (2006). *American Hegemony and the Postwar Reconstruction of Science in Europe*. MIT Press. <https://mitpress.mit.edu/books/american-hegemony-and-postwar-reconstruction-science-europe>
7. Nandy, A. (1988). *Science, Hegemony and Violence: A Requiem for Modernity*. Oxford University Press.

Module 2: Traditions of Indian Knowledge System, Scientific Practices and Achievements

Essential Readings:

1. Bag, A. K. (1979). *Mathematics in Ancient and Medieval India*. Chaukhamba Orientalia
2. Bhargava, Manjul. 'Musing on Music and Maths', *Madras Musings*, January 16, 2016, <http://www.madrasmusings.com/vol-25-no-19/musing-on-musicand-maths/>.
3. Bhargava, Manjul. 'India Has to Be Its Own Cultural Ambassador, But It Has to Be Scientific About It', *The Wire*, accessed March 10, 2019, <https://thewire.in/history/india-has-to-be-its-own-cultural-ambassador-but-it-has-to-bescientific-about-it-manjul-bhargava>
4. Dharampal, *Indian Science and Technology in the Eighteenth Century*, vol. 1, 5 vols, *Collected Writings of Dharampal*, Other India Press, Mapusa, Goa, 1971, <http://archive.org/details/IndianScienceAndTechnologyIntheEighteenthCentury>.
5. Filliozat, J. (1964). *The Classical Doctrine of Indian Medicine*. Munshiram Manoharlal. <https://www.mlbld.com>
6. Joseph, G. G. (2011). *The Crest of the Peacock: Non-European Roots of Mathematics*. Princeton University Press. <https://press.princeton.edu/books/paperback/9780691135267>

7. Kak, S. (2000). *The Astronomical Code of the Rigveda*. Munshiram Manoharlal. <https://www.mrmlonline.com>
8. Rao, S. R. (1991). *Dawn and Devolution of the Indus Civilization*. Aditya Prakashan
9. Ray, P. C. (1902). *A History of Hindu Chemistry*. <https://archive.org/details/historyofhinduch00rayp>
10. Sabareesh, P. A. (2021). *A Brief History of Science in India*. Garuda Prakashan. <https://garudabooks.com>
11. Sabareesh, P. A., & Sony, A. L. R. (2021). *Traditional Medicinal Knowledge System and Intellectual Property Rights: Scientific Validation of Tri-doshas in Ayurveda*. *Journal of Intellectual Property Rights*, 26(3), 146–161. <https://nopr.niscpr.res.in/handle/123456789/58037>
12. Sabareesh, P. A., Pandey, A. C., & Kotecha, R. (2025). *Yoga as a Complementary Cancer Therapy for Mitigating Oncological Repercussions: A review*. *Indian Journal of Traditional Knowledge*, 24(11), 1011–1019. <https://or.niscpr.res.in/index.php/IJTK/article/view/19877/5095>
13. Siddhartha J. 'The Harmony of Music, Mathematics And Sanskrit As Explained By Dr Manjul Bhargava', *Swarajya*, April 7, 2020, <https://swarajyamag.com/ideas/the-harmony-of-music-mathematics-and-sanskrit-as-explained-by-dr-manjul-bhargava>.
14. Subbarayappa, B. V. (2013). *The Roots of Ancient Medicine: An Historical Outline*. Centre for Studies in Civilizations. <http://www.cscsarchive.org>

Additional Readings:

1. Arnold D. *Science, Technology and Medicine in Colonial India*. Cambridge University Press; 2000. <https://www.cambridge.org/core/books/science-technology-and-medicine-in-colonial-india/11078B2C9BF162E7417BCD70AAE73082>
2. Kangle, R. P. (2010). *The Kautiliya Arthashastra*. Motilal Banarsidass. <https://www.mlbld.com>
3. Olivelle, P. (2013). *King, Governance, and Law in Ancient India*. Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780199891825.001.0001>
4. Seidenberg, A. (1978). *The Origin of Mathematics*. *Archive for History of Exact Sciences*, 18(4), 301–342. <https://doi.org/10.1007/BF00348404>

Module 3: India and the Circulation of Knowledge Across Civilizations

Essential Readings:

1. Acharya, A. (2013). *Civilizations in Embrace: The Spread of Ideas and the Transformation of Power: India and Southeast Asia in the Classical Age*. ISEAS Publishing. <https://www.cambridge.org/core/books/civilizations-in-embrace/413876687E1BC05BABEC9608442CFDF2>
2. Beal, S. (Trans.). (1884/2005). *Si-Yu-Ki: Buddhist Records of the Western World*. Munshiram Manoharlal. <https://archive.org/details/cu31924023029485>
3. Gibb, H. A. R. (Trans.). (1958). *The Travels of Ibn Battuta, A.D. 1325–1354*. Cambridge University Press. <https://archive.org/details/travelsofibanbatt00ibnuoft>
4. Hobson, J. M. (2004). *The Eastern Origins of Western Civilization*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511483509>
5. Joseph, G. G. (2011). *The Crest of the Peacock: Non-European Roots of Mathematics*. Princeton University Press. <https://press.princeton.edu/books/paperback/9780691135267>
6. Legge, J. (Trans.). (1886/1965). *A Record of Buddhistic Kingdoms: Being an Account by*

- the Chinese Monk Fa-Hien of his Travels in India and Ceylon (A.D. 399–414)*. Dover Publications. <https://archive.org/details/recordofbuddhist00fahsuoft>
7. McCrindle, J. W. (Trans.). (1877/2010). *Ancient India as Described by Megasthenes and Arrian*. Cambridge University Press. <https://archive.org/details/ancientindiaasde00mc>
 8. McNeill, W. H. (1963). *The Rise of the West: A History of the Human Community*. University of Chicago Press. <https://press.uchicago.edu>
 9. Pollock, S. (2006). *The Language of the Gods in the World of Men*. University of California Press. <https://doi.org/10.1525/9780520932029>
 10. Sabareesh, P. A. (2021). *A Brief History of Science in India*. Garuda Prakashan. <https://garudabooks.com>
 11. Sachau, E. C. (Trans.). (1910/2001). *Alberuni's India*. Routledge. <https://archive.org/details/alberunisindiaac01biruoft>
 12. Sen, A. (2005). *The Argumentative Indian*. Penguin Books. <https://penguin.co.in>

Additional Readings:

1. Basalla, G. (1967). *The Spread of Western Science*. *Science*, 156(3775), 611–622. <https://doi.org/10.1126/science.156.3775.611>
2. Basham, A. L. (1954). *The Wonder That Was India*. Picador. <https://us.macmillan.com/books/9780330439091/thewonderthatwasindia>
3. Elman, B. A. (2005). *On Their Own Terms: Science in China, 1550–1900*. Harvard University Press. <https://www.hup.harvard.edu>
4. Goonatilake, S. (1998). *Toward a Global Science*. Indiana University Press.
5. Hobson, J. M. (2004). *The Eastern Origins of Western Civilisation*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511483509>
6. Raja Mohan, C. (2003). *Crossing the Rubicon: The Shaping of India's New Foreign Policy*. Palgrave Macmillan. <https://link.springer.com/book/10.1057/9780230505704>
7. Said, E. W. (1978). *Orientalism*. Pantheon Books. <https://penguinrandomhouse.com>
8. Sen, A. (2005). *The Argumentative Indian*. Penguin Books India. <https://penguin.co.in/book/the-argumentative-indian/>
9. Schoff, W. H. (Trans.). (1912). *The Periplus of the Erythraean Sea*. Longmans, Green & Co. <https://archive.org/details/periplusoferythr00schouoft>
10. Watters, T. (1904). *On Yuan Chwang's Travels in India*. Royal Asiatic Society. <https://archive.org/details/onyuanchwangstr01wattuoft>
11. Yule, H. (Ed.). (1903). *The Book of Ser Marco Polo*. John Murray. <https://archive.org/details/bookofsermarcopo01polo>

Module 4: Science, Ethics, Dharma and Education in India

Essential Readings:

1. Altekar, A. S. (1944). *Education in Ancient India*. Nand Kishore & Bros. <https://archive.org>
2. Dharampal. (2000). *The Beautiful Tree: Indigenous Indian Education in the Eighteenth Century*. Other India Press. <http://www.otherindiapress.org.in>
3. Gandhi, M. K. (1938). *Hind Swaraj and Other Writings*. Navajivan Publishing House. <https://www.gandhiheritageportal.org>
4. Joseph, G. G. (2011). *The Crest of the Peacock: Non-European Roots of Mathematics*. Princeton University Press. <https://press.princeton.edu/books/paperback/9780691135267>
5. Keay, F. E. (1918). *Ancient Indian Education*. Oxford University Press. <https://archive.org/details/ancientindianedu00keayuoft>

6. Mookerji, R. (1947). *Ancient Indian Education: Brahmanical and Buddhist*. Motilal Banarsidass. <https://www.mlbd.com>
7. Nandy, A. (1988). *Science, Hegemony and Violence: A Requiem for Modernity*. Oxford University Press.
8. Olivelle, P. (2013). *King, Governance, and Law in Ancient India*. Oxford University Press.
<https://doi.org/10.1093/acprof:oso/9780199891825.001.0001>
9. Sabareesh, P. A. (2021). *A Brief History of Science in India*. Garuda Prakashan.
<https://garudabooks.com>
10. Schumacher, E. F. (1973). *Small is Beautiful: Economics as if People Mattered*. Harper & Row. <https://www.harpercollins.com>
11. Tagore, R. (1917). *Nationalism*. Macmillan.
<https://archive.org/details/nationalism00tagouoft>

Additional Readings:

1. Altekar, A. S. (2009). *Education in Ancient India*. Isha Books.
2. Capra, F. (1982). *The Turning Point*. Simon & Schuster.
<https://www.simonandschuster.com>
3. Gandhi, M. K. (1909/2009). *Hind Swaraj*. Navajivan Publishing House.
<https://www.gandhiheritageportal.org>
4. Ghosh, A. (Ed.). (1990). *An Encyclopedia of Indian Archaeology*. Munshiram Manoharlal
- Harding, S. (1998). *Is science multicultural?* Indiana University Press.
5. Mookerji, R. (2011). *Ancient Indian Education: Brahmanical and Buddhist*. Motilal Banarsidass. <https://www.mlbd.com>
6. Olivelle, P. (2013). *King, Governance, and Law in Ancient India*. Oxford University Press.
<https://doi.org/10.1093/acprof:oso/9780199891825.001.0001>
7. Shiva, V. (1993). *Monocultures of the Mind*. Zed Books. <https://www.zedbooks.net>
8. Sen, A. (1999). *Development as Freedom*. Oxford University Press.
<https://global.oup.com>
9. Sharma, R. S. (2005). *India's Ancient Past*. Oxford University Press.
<https://global.oup.com>

Module 5: Colonialism, Intellectual Imperialism and Scientific Change

Essential Readings:

1. Basalla, G. (1967). *The Spread of Western Science*. *Science*, 156(3775), 611–622.
<https://doi.org/10.1126/science.156.3775.611>
2. Chakrabarty, D. (2000). *Provincializing Europe: Postcolonial Thought and Historical Difference*. Princeton University Press. <https://doi.org/10.1515/9781400828657>
3. Cohn, B. S. (1996). *Colonialism and its Forms of Knowledge*. Princeton University Press.
<https://press.princeton.edu/books/paperback/9780691000435>
4. Dharampal. (2000). *The Beautiful Tree*. Other India Press.
<http://www.otherindiapress.org.in>
5. Kumar, D. (1995). *Science and the Raj: A Study of British India*. Oxford University Press.
<https://global.oup.com>
6. Prakash, G. (1999). *Another Reason: Science and the Imagination of Modern India*. Princeton University Press. <https://press.princeton.edu/books/paperback/9780691004525>
7. Sabareesh, P. A. (2021). *A Brief History of Science in India*. Garuda Prakashan.

<https://garudabooks.com>

8. Visvanathan, S. (1985). *Organizing for Science: The Making of an Industrial Research Laboratory*. Oxford University Press.

Additional Readings:

1. Abraham, I. (1998). *The Making of the Indian Atomic Bomb: Science, Secrecy and the Postcolonial State*. Zed Books. <https://www.zedbooks.net>
2. Alvares, C. (1992). *Decolonizing History: Technology and Culture in India, China and the West*. Other India Press. <http://www.otherindiapress.org.in>
3. Cesaire, A. (2000). *Discourse on Colonialism*. Monthly Review Press. <https://monthlyreview.org>
4. Fanon, F. (1961). *The Wretched of the Earth*. Grove Press. <https://groveatlantic.com>
5. Habib, S. I., & Raina, D. (2004). *Social History of Science in Colonial India*. Oxford University Press. <https://global.oup.com>
6. Krige, J. (2006). *American Hegemony and the Postwar Reconstruction of Science in Europe*. MIT Press. <https://mitpress.mit.edu/books/american-hegemony-and-postwar-reconstruction-science-europe>
7. Nandy, A. (1988). *Science, Hegemony and Violence: A Requiem for Modernity*. Oxford University Press.
8. Raja Mohan, C. (2003). *Crossing the Rubicon: The Shaping of India's New Foreign Policy*. Palgrave Macmillan. <https://link.springer.com/book/10.1057/9780230505704>
9. Said, E. W. (1993). *Culture and Imperialism*. Vintage Books. <https://www.penguinrandomhouse.com>