ARIZONA STATE UNIVERSITY

GENERAL STUDIES COURSE PROPOSAL COVER FORM

Course information:

*Copy and paste **current** course information from Class Search/Course Catalog.*

Academic Unit Coll. Liberal arts & Sci. Department SILC

Subject SLC Number 294 Title History of Science, Technology, and Culture in Indian Subcontinent Units: 3

Is this a cross-listed course? No
If yes, please identify course(s)

Is this a shared course? (choose one) If so, list all academic units offering this course
Course description:

Requested designation: (Choose One)
*Note- a **separate** proposal is required for each designation requested*

Eligibility:

Permanent numbered courses must have completed the university's review and approval process.
For the rules governing approval of omnibus courses, contact the General Studies Program Office at (480) 965-0739.

Submission deadlines dates are as follow:

For Fall 2014 Effective Date: October 10, 2013 For Spring 2015 Effective Date: March 13, 2014

Area(s) proposed course will serve:

A single course may be proposed for more than one core or awareness area. A course may satisfy a core area requirement and more than one awareness area requirements concurrently, but may not satisfy requirements in two core areas simultaneously, even if approved for those areas. With departmental consent, an approved General Studies course may be counted toward both the General Studies requirement and the major program of study.

Checklists for general studies designations:

Complete and attach the appropriate checklist

- Literacy and Critical Inquiry core courses (L)
- Mathematics core courses (MA)
- Computer/statistics/quantitative applications core courses (CS)
- Humanities, Fine Arts and Design core courses (HU)
- Social and Behavioral Sciences core courses (SB)
- Natural Sciences core courses (SQ/SG)
- Global Awareness courses (G)
- Historical Awareness courses (H)
- Cultural Diversity in the United States courses (C)

A complete proposal should include:

- ☒ Signed General Studies Program Course Proposal Cover Form
- ☒ Criteria Checklist for the area
- ☒ Course Catalog description
- ☒ Course Syllabus
- ☒ Table of Contents from the textbook and list of required readings/books

Respectfully request that proposals are submitted electronically with all files compiled into one PDF. If necessary, a hard copy of the proposal will be accepted.

Contact information:

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Department Chair/Director approval: *(Required)*

Chair/Director name (Typed): Robert Joe Cutter Date: 2/11/14

Chair/Director (Signature): Robert Joe Cutter

Rev. 1/94, 4/95, 7/98, 4/00, 1/02, 10/08, 11/11/ 12/11, 7/12

Course catalog description:

This class will review the past in reference to the development of science, technology and culture in the Indian subcontinent in the light of research and findings available at present. The class will be based on scholarly readings and in-class discussions facilitated by the instructor.

Arizona State University Criteria Checklist for

HISTORICAL AWARENESS [H]

Rationale and Objectives

The lack of historical awareness on the part of contemporary university graduates has led recent studies of higher education to call for the creation and development of historical consciousness in undergraduates now and in the future. From one perspective historical awareness is a valuable aid in the analysis of present-day problems because historical forces and traditions have created modern life and lie just beneath its surface. From a second perspective, the historical past is an indispensable source of national identity and of values which facilitate social harmony and cooperative effort. Along with this observation, it should be noted that historical study can produce intercultural understanding by tracing cultural differences to their origins in the past. A third perspective on the need for historical awareness is summed up in the aphorism that he who fails to learn from the past is doomed to repeat it. Teachers of today's students know well that those students do not usually approach questions of war and peace with any knowledge of historic concord, aggression, or cruelty, including even events so recent as Nazi and Stalinist terror.

The requirement of a course which is historical in method and content presumes that "history" designates a sequence of past events or a narrative whose intent or effect is to represent such a sequence. The requirement also presumes that these are human events and that history includes all that has been felt, thought, imagined, said, and done by human beings. The opportunities for nurturing historical consciousness are nearly unlimited. History is present in the languages, art, music, literatures, philosophy, religion, and the natural sciences, as well as in the social science traditionally called History.

Proposer: Please complete the following section and attach appropriate documentation.

ASU--[H] CRITERIA			
THE HISTORICAL AWARENESS [H] COURSE MUST MEET THE FOLLOWING CRITERIA:			
YES	**NO**		**Identify Documentation Submitted**
☒	☐	1. History is a major focus of the course.	"History of Science, technology and Culture in Indian Subcontinent" Syllabus
☒	☐	2. The course examines and explains human development as a sequence of events.	Course Syllabus and the list of assigned readings
☒	☐	3. There is a disciplined systematic examination of human institutions as they change over time.	Assigned Readings list in the Syllabus
☒	☐	4. The course examines the relationship among events, ideas, and artifacts and the broad social, political and economic context.	Syllabus
		THE FOLLOWING ARE NOT ACCEPTABLE:	
		• **Courses in which there is only chronological organization.**	
		• **Courses which are exclusively the history of a field of study or of a field of artistic or professional endeavor.**	
		• **Courses whose subject areas merely occurred in the past.**	

Course Prefix	Number	Title	Designation
SLC	294	History of Science and Culture in Indian Subcontinent	H

Explain in detail which student activities correspond to the specific designation criteria. Please use the following organizer to explain how the criteria are being met.

Criteria (from checksheet)	How course meets spirit (contextualize specific examples in next column)	Please provide detailed evidence of how course meets criteria (i.e., where in syllabus)
History is a major focus of the course	This class will review the past in reference to the Indian subcontinent in the light of research and findings available at present.	Points in the Student Lerning Outcomes in the syllabus.
Human Development as a sequence of events	The perspective of the course is historical. But it will be presented in a non-linear or a fuzzy way. Its context will be cultural in all its major aspects-scientific, technological, and humanistic.	List of assigned readings in the syllabus
Disciplined and systematic examination of human institutions as it changes over time.	The proposed course will be based on the time tested truth that no civilization can remain great or escape break down without a sound theoretical or practical understanding underlying it. The students will contemplate upon the relatively recent dichotomies between theory and practice, science and technology, nature and nurture and their cognates.	Syllabus lists the power point presentations and the assigned redings that will be the subject of in-class guided discussions.

The course examines the relationship among events, ideas, and artifacts and the broad social, political and economic context.	Attempts will be made to indicate how different languages, religions, ethnic groups and their cultural forms, the Asian and European presence, their thought and action, have contributed to the shaping of India and to the emergence of a civilizational state.	Syllabus: Assigned scholarly readings.

Syllabus SLC294: History of Science and Culture in Indian Subcontinent:

1. Course Description:

The proposed course will be based on the time tested truth that no civilization can remain great or escape break down without a sound theoretical or practical understanding underlying it. The students will contemplate upon the relatively recent dichotomies between theory and practice, science and technology, nature and nurture and their cognates. Fragmentation and parochialism are gaining ground and the philosophical insights in to the linkages between the different branches of learning are being lost in the name of specialization. A balanced emphasis on *dharma* and *karma*, knowledge and virtue, pure reason and practical reason is evident in all the lasting cultures of the world- the Indic, Sinic, Semitic-Arabic, and Hellenic-European. Another angle considered in the course is the fact that the roots even of formal sciences such as geometry and arithmetic are traceable to our life-world which is shared by the literary and the laity.

The perspective of the course is historical. But it will be presented in a non-linear or a *fuzzy* way. Its context will be cultural in all its major aspects- scientific, technological, and humanistic. The course will touch upon the contemporaneous nature of history and also its futuristic implications. Not just the past and present of India but also her projected identity in the 21st century will be of interest to the current and future intelligentsia of the world.

Attempts will be made to indicate how different languages, religions, ethnic groups and their cultural forms, the Asian and European presence, their thought and action, have contributed to the shaping of India and to the emergence of a civilizational state.

The course will form a good foundation for a graduate of any discipline.

2. Student Learning Outcomes:

This class will review the past in reference to the Indian subcontinent in the light of research and findings available at present.

Upon successful completion of the course:

- The students would have explored the Indian understanding of, and attitude to science over ages. The students would have an appreciation for the relationship of this science over other activities, philosophical, social, economic which taken together constitute the Indian culture.
- Students would have viewed the history of science and culture through metaphysical approach.

- **The students would have learnt to critically question the established beliefs and would have learned that to love and respect a culture does not require one to be unmindful of its blemishes and dead aspects.**
- The students would have been exposed to the subject matter of history of science technology and culture from the stand point of archeology.
- The students would have delved upon the question why the scientific tradition that existed till 1200 A.D. in the Indian subcontinent did not continue in the second millennium.
- The students would have learned about the history of Biology, Chemistry and Alchemy in India from Pre-historic to Pre-modern Times.
- The students would have gained an overall understanding of the complex relationship between the development of science, technology and its influence on culture and vise-a versa. The students would have learned that the development of formal sciences has very intimate relations to the regular forms and features of our life.

3. Listing of Assignments:

- **There will be a scholarly publication assigned per week of the six week Summer session. The instructor will facilitate an in class discussion and assist the students in gaining understanding of some culture specific terms.**
- **There will be a quiz following each assigned reading that will test the students understanding of the material.**
- **The students will be required to write two term papers. They will be free to select a topic based on the in-class readings or a related topic of their interest that will have to be pre-approved by the instructor.**

4. Grading Policy:

- **Quizzes** **30%**
- **In class participation:** **15 %**
- **Attendance:** **15%**
- **Midterm Paper:** **20%**
- **Final Paper:** **20%**

5. Required Readings (and recommended readings, where applicable).

Reference Reading:

Karl Pearson: The Grammar of Science, p. 24 etc.

Dampier, Sir William Cecil, a History of Science, p. 10 etc.

The following papers from Volume I of "History of Science, Philosophy and Culture in Indian Civilization" will be read and discussed in class.

1. On the Nature of Interconnection between Science, Technology, Philosophy and Culture By D. P. Chattopadhyaya

   Establishing the relationship between Science, Technology, Philosophy and Culture

2. History of Science in Relation to Philosophy and Culture in Indian Civilization By S. N. Sen
   Sen seems to prefer the historical method in studying the relation between science-technology philosophy and culture. To be more specific he wants to follow it from within. To grasp it in perspective, he maintains, 'It is necessary to explore the Indian understanding of, and attitude to science over ages, and their conscious appreciation…of the relationship of this science over other activities, philosophical, social, economic which taken together constitute their culture.

3. Culture and Cultures By G. C. Pande
   Pande refers to the scientific and historical approaches to culture, explains in details his own preference for the metaphysical approach and also offers the grounds for his preference. He painstakingly tries to show how the material, scientific and technological expressions are interlinked between themselves and rooted in human nature.

4. Four Questions that History Might Answer By J. V. Narlikar
   To love and respect a culture does not require one to be unmindful of its blemishes and dead aspects. This point has been raised by Narlikar in the specific context of the scientific content of the Vedas. He looks at the astronomical ideas found in the ancient writings. He is critical about Vedic mathematic and sophisticated technology of guided missiles found in ancient scriptures of Ramayana and Mahabharata.

5. Mathematical and Astronomical heritage of India By A. K. Bag
   Bag tries to show that the development of formal sciences has very intimate relations to the regular forms and features of our life. For example, people like to know the right time to do religious rituals, agricultural activities, record the repeated events of seasons, stars, movements of planets and other celestial bodies. He sheds light on the area calculations, of relationship between mathematics) and astrology as both are essentially computational. The emergence of decimal system and use of zero on computations is discussed. Calculations for identifying appropriate times for sowing and cultivating the land, identifying and naming the stars and planets, Lunar calendar and nomenclature of months etc. is also discussed.

6. Scientific Tradition in India (3400 – 1500 B. C.) By S. R. Rao
   Rao approaches the subject matter of history of science technology and culture from the stand point of an archeologist. He highlights that Harappans were pioneers in studying tidal waves and currents that lead to the development of the tidal clock at Lothal. Sea trade with Mesopotamia (Iraq), Elam (Iran) and Syria lead to exchange of not only merchandise but also ideas. Town planning in Harappa shows the knowledge of science of hydrology enabling them to keep their cities and towns meticulously clean. Rao credits the Harappans for the development of the science of Yoga and alpha numeric system of writing.

7. Scientific Traditions and Other Traditions By B. N. Udgaonkar
   Rather than debunking the flawed theories of outsiders, Udgaonkar asks the question why the scientific tradition that existed till 1200 A.D. did not continue in the second millennium. He attributes it to the misinterpretation of such concepts like Maya and Karma and finds a link in Vivekananda between ancient and Modern science. Udgaonkar sheds light on rigid cast system and limitations of guru-shishya parampara as responsible for the decline of science and practical knowledge leading to an instructive controversy.

8. History of Chemistry and Alchemy in India from Pre-historic to Pre-modern Times By V. Deshpande
   So far as alchemy and chemistry are concerned it will be wrong to admit that medieval history of science in India was dark. This admirable period came to a standstill around the 17th century. Deshpande presents the basic elements of Indian Chemistry that are generally culled out of three main sources, namely, archeological findings, literary records, and the study of traditionally available techniques. Materials available from the history of Indian chemistry have been grouped under four headings, from pre-historic times to 600 AD, Chemical arts and crafts, history of alchemy and the later developments.

9. The Scientific Temper and Scientific Method in Science in India through History with special reference to Biology By Bhargava and Chakraborti
   The mixed character of science and non-science is clearly indicated by the instructive history of biology and medicine in India. Referring to the authoritative works of Charaka, Sushruta and Prashara the authors show that while in some areas their observations and conclusions and amazingly are correct while in others their views are quite indefensible.

10. Education In Ancient India (AD 300-1000) Some Aspects of Theory and Practice By S. Sankaranarayanan

To understand the cultural heritage of India, its scientific and philosophical tradition it is necessary to know the educational systems, familial-oral, and public which were there in the ancient and medieval times. Also of interest is how the fine arts and crafts were sustained and developed. Some of these issues have been dealt with in this presentation. He brings forth the point that the Indian science is not to be taken as Hindu Science, Islamic Science or Buddhist science as it has been enriched by contributions from different groups and sects.

11. A Perspective of Indian Science of Tenth – Eighteenth Centuries By A. Rahaman
To start with Rahaman, refers to the European approach to the history of science highlighting the medieval system of production controlled by the feudal system and the church. The then theoreticians looked at the history of Asian development as an outgrowth of what was happening in Europe. This got accentuated in the 19th century due to industrialization. The separate identity of Asian science was not appreciated by them. Rehaman further goes to indicate that the language of science in India, Sanskrit posed a sort of barrier between the writer and the reader. The complex ideas expressed as coded, compressed verses were not easily intelligible to the uninitiated scholar, not to speak of the common people. The increased Islamic presence in India during the second Millennium AD was followed up by the rising influence of scientific literature in Persian and Arabic. Later on the Sufi culture and Bhakti Yoga proved to be a deterrent in the path of scientific development.

6. **Course Itinerary:**
A weekly schedule, including reading and writing assignments, exam dates, etc.

Summer Six Week Session: July 2nd – August 12th.

Week 1: Power point Presentation: Indian subcontinent till pre-independence

Paper 1 and 2 from the readings list above.

Week 2: Power point Presentation: Brief presentation on Vedas.

Paper 3 and 4 from the readings list above.

Week 3: Power point Presentation: Indian Astronomy, Lunar calendar, Naming of constellations, months, days etc.

Paper 5 and 6 from the readings list above. **MIDTERM PAPER DUE**

Week 4: Power point Presentation: Nasadiya Sukta (Rigveda) and Big Bang Theory

Paper 7 and 8 from the readings list above.

Week 5: Power point Presentation: Ayurveda development from beginning of time till 600 A.D.

Paper 9 and 10 from the readings list above.

Week 6: Power point Presentation: Science and technology in Modern India

Recap and work on final paper. **FINAL PAPER DUE**

7. **A Statement on academic dishonesty** - include the following statement:

   Academic honesty is expected of all students in all examinations, papers, laboratory work, academic transactions and records. The possible sanctions include, but are not limited to, appropriate grade penalties, course failure (indicated on the transcript as a grade of E), course failure due to academic dishonesty (indicated on the transcript as a grade of XE), loss of registration privileges, disqualification and dismissal. For more information, see http://provost.asu.edu/academicintegrity.

8. **A Disability Policy Statement –** sample syllabus statements regarding disability accommodations are listed below:

   Disability Accommodations: Qualified students with disabilities who will require disability accommodations in this class are encouraged to make their requests to me at the beginning of the semester either during office hours or by appointment. **Note:** Prior to receiving disability accommodations, verification of eligibility from the Disability Resource Center (DRC) is required. Disability information is confidential.

   Establishing Eligibility for Disability Accommodations: Students who feel they will need disability accommodations in this class but have not registered with the Disability Resource Center (DRC) should contact DRC immediately. Their office is located on the first floor of the Matthews Center Building. DRC staff can also be reached at: 480-965-1234 (V), 480-965-9000 (TTY). For additional information, visit: www.asu.edu/studentaffairs/ed/drc. Their hours are 8:00 AM to 5:00 PM, Monday through Friday.