

NATIONAL INSTITUTE OF ADVANCED STUDIES

COURSE OFFERINGS

FIRST SEMESTER (AUGUST- NOVEMBER) 2016

(1) School of Conflict and Security Studies

(1) Course Title: Security, Conflict and Strategy: Concepts and Issues

Course Coordinators: Dr. M. Mayilvaganan, Dr. Arun Vishwanathan and Dr. Anshuman Behera

Course Instructor(s): Prof. Rajaram Nagappa, Prof. S. Chandrashekar, Prof. Narendar Pani, Prof. Lalitha Sundaresan, Prof. Suba Chandran, Dr. M. Mayilvaganan, Dr. Arun Vishwanathan, Dr. Anshuman Behera, Dr. Prakash Panneerselvam

Credit Hours: Three (School-level Course)

Course Description: The course will seek to introduce the students to the debates, theories, concepts and major issues surrounding Security, Conflict and Strategy.

Learning Objectives:

The students of the course will be able to:

- Understand the major concepts of international relations, strategy, security and conflict studies such as the international system, balance of power, conflict, national security, nuclear proliferation, disarmament, science and technology dimension of security, etc.
- Identify the key actors in international relations—including states, non-governmental organizations, intergovernmental organizations, civil society, and individuals—and understand how these actors interact.
- Demonstrate knowledge of the multi-disciplinary nature of international relations, strategy and conflict by establishing connections with each other and with the other disciplines that have shaped and continue to influence such as politics, economics, society, culture, history, language, race, and ethnicity, etc.
- Understand contemporary world politics, particularly key dimensions, events, issues and challenges.
- Demonstrate an ability to analyze international and national issues and draw correct inferences with the learned skills

Pre-requisites for registration/auditing: No Prior Background Needed

Expected Student Workload:

There will be one lecture for three hours per week. The remaining will be distributed for reading, research, and writing assignments related to the course as expected by the course instructor(s).

Course Duration: August-November 2016

Probable starting date and schedule/ timings: Every Tuesday afternoon 2 to 5 pm.

Lecture Topics and Discussion

1. Introduction to Concepts (1 Lecture - 3 hours)
 - 1.1. Introduction to International Relations
 - 1.2. Introduction to Strategy
 - 1.3. Introduction to Conflict

2. Theoretical Section (4 Lectures: 3 hours each)
 - 2.1. Game Theory and Decision Making
 - 2.2. Theoretical Foundations of Conflict
 - 2.3. Theories of International Relations (Realism, Neo-Realism, Liberalism and Constructivism, International Political Economy)
 - 2.4. Understanding Strategy: Theoretical Developments

3. Issues- (10 lectures : 3 hours each)
 - 3.1. Internal Security (2 sections)
 - 3.2. India's Neighborhood
 - 3.3. Geopolitics of Asia-Pacific 1 (China and South China Sea)
 - 3.4. Geopolitics of Asia-Pacific 2 (Japan and East China Sea)
 - 3.5. Nuclear Weapons and Southern Asia
 - 3.6. S&T Dimension of National Security
 - 3.7. Military and National Security (Civ-Mil Relations, Militaries in Pak, India & China)
 - 3.8. Non-Traditional Security Concerns
 - 3.9. Economic Dimensions of Conflict and Security
 - 3.10. Statistical Approaches to Studying Strategic Issues

Basis for Final Grades

End Semester Exam (**40 %**)

Final Presentation (**30 %**)

Assignments and Class Participation (**20+10 %**)

Reading List

- John Bew, *Realpolitik: A History*, Oxford: Oxford University Press, 2016.
- Robert Ayson, *Thomas Schelling and the Nuclear Age: Strategy as Social Science*, London: Frank Cass, 2004.
- John Baylis, Steve Smith and Patricia Owens, *The Globalization of World Politics: An Introduction to International Relations*, Oxford University Press, 2014 (6 edition)
- Joyce Kaufman, *Introduction to International Relations: Theory and Practice*, Rowman & Littlefield Publishers, 2013.
- Bill Hayton, *The South China Sea: The Struggle for Power in Asia*, Yale University Press; First Edition edition (October 28, 2014)
- Robert D. Kaplan, *Asia's Cauldron: The South China Sea and the End of a Stable Pacific*, Random House Trade Paperbacks, 2015.
- Mely Caballero-Anthony, *An Introduction to Non-Traditional Security Studies: A Transnational Approach*, SAGE, 2015
- Mely Caballero Anthony, Ralf Emmers, and Amitav Acharya, eds. *Non-Traditional Security in Asia: Dilemmas in Securitization*, Ashgate Publishing Ltd., 2006.
- Burton, John and et.al. 1993. *Conflict: Practices in Management, Settlement and Resolution*. New York: St. Martin's Press.
- Coser, Lewis. 1956. *The Functions of Social Conflict*. New York: Free Press.

(2) Course Title: Understanding Conflict

Subject/Discipline: Conflict Studies and Conflict Resolution

Name of Instructor: Dr. Anshuman Behera

Level of Course: Post-Graduate, PhD

Credit Hours: Three

Type: This is primarily a lecture based course. The course will also involve seminars and guided readings.

Brief Description: The purpose of this course is to provide a broad overview of understanding conflict. It includes major theoretical/philosophical positions, debates and important conflicts that India has been witnessing. The first portion of the course brings together theoretical positions, both Western and Indian, to have better understanding in conceptualising conflict. The second portion is on major individual conflicts India has been facing for long time. This course will help understand the interface between individual conflicts and larger conceptualisation of conflict.

Course Outline

Understanding Conflict: An introduction

Philosophical Foundations of Understanding Conflict

- Johan Galtung
- Lewis Coser
- C. Wright
- Karl Marx
- Paul Collier and Anke Hoeffler
- John Paul Ladrech
- M K Gandhi
- B R Ambedkar
- R M Lohia

Understanding conflicts in India

- Conflict over identity and ethnicity issues (case studies of conflicts in Northeast India: Nagaland, Manipur, Assam, Tripura and Meghalaya)
- Conflict over Regionalism (Telengana and Gorkhaland)
- Conflict over ideology, language and religion (The Maoist conflict, Communal violence, linguistic conflicts)
- Conflict over autonomy (Kashmir)
- Conflict over resources (Cauvery water, Land acquisition)
- Conflict over environment (Chipko movement, Narmada Bachao Andolan and Niyamgiri).
- Conflict over development and rehabilitation.

Course Duration: August to November 2016

Reading List (Select)

- Barbanti. 2004. Development and Conflict Theory. online.
http://www.beyondintractability.org/essay/development_conflict_theory/?nid=1158
- Bhargava, Rajeev, ed. 2005. Secularism and Its Critics, New Delhi: Oxford University Press.
- Burton, John and et.al. 1993. Conflict: Practices in Management, Settlement and Resolution. New York: St. Martin's Press.
- Chandhoke, N. 2003. The Concept of Civil Society, New Delhi: Oxford University Press.
- Collier, Paul and Hoeffler Anke, Greed and Grievance in Civil War, Oxford Economic Papers, 56 (2004), 563-595.
- Coser, Lewis. 1956. The Functions of Social Conflict. New York: Free Press.
- Galtung, J. 1965. 'On the Meaning of Nonviolence.' Journal of Peace Research, 2(4).
- Galtung, Johan. 1985. 'Twenty-five Years of Peace Research: Ten Challenges and Some Responses.' Journal of Peace Research 22(2): 141-158.
- Galtung, Johan. 1996. Peace by Peaceful Means: Peace, Conflict, Development and Civilization. New Delhi: Sage Publication.
- Gandhi, M.K. 1927. An Autobiography: The Story of My Experiments with Truth, Reprint, Ahmedabad: Navajivan Publishing House.
- International Conflict, Washington, D.C.: United States Institute of Peace Press.
- Jayaram, N, et al. 1996, Social Conflict. New Delhi: Oxford University Press.
- Johnson, Linda. 2005, Narrative Analysis. In Doing Research: Methods of Inquiry for Conflict Analysis, edited by Druckman, Daniel. London: Sage Publications.
- Kakar, Sudhir. 1996. The Colours of Violence. New Delhi: Penguin Books.
- Kaviraj, S., and S. Khilnani, eds. 2002. Civil Society: History and Possibilities. Delhi: Cambridge University Press.
- Kothari, C.R. 200. Research Methodology: Methods & Techniques. New Delhi: New Age International Publishers.
- Lederach, John Paul. 1995. Preparing for Peace: Conflict Transformation Across Cultures. New York: Syracuse University Press.
- Lederach, John Paul, 2003, Little Book of Conflict Transformation: Intercourse. PA: Good Books.
- Pani, Narendar, 2001, Inclusive Economics Gandhian method and contemporary policy, New Delhi, Sage.
- Parekh, Bhikhu. 1989. Gandhi's Political Philosophy: A Critical Examination. Basingstoke: Macmillan.

- Pruitt & Kim. 2004. *Social Conflict: Escalation, Stalemate, and Settlement*. 3rd Edition. Boston: McGraw-Hill.
- Roy, Beth. 1994. *Some Trouble with Cows: Making Sense of Social Conflict*. Berkley: University of California Press.
- Sen, Amartya. 2006. 'Globalization and Voice.' In *Identity and Violence*, 120-148. New York: W.W. Norton and Company.
- Smock, David R. 1995. *Perspectives on Pacifism: Christian, Jewish and Muslim Views on Non-violence and*
- Sponsel, Leslie E and Thomas Gregor, eds. 1994. *The Anthropology of Peace and Non- Violence*. Bouldert, Colo: L.Rienner.
- Upadhyaya, P. 2009. 'Peace and Conflict: Reflections on Indian Thinking.' *Strategic Analysis*, 33(1).
- Upadhyaya, Priyankar. 2010. 'Communal Peace in India: Lessons from Multicultural Banaras.' In *Religion and Security in South and Central Asia* edited by Warikoo, K. London: Routledge.
- Upadhyaya, Priyankar. 2010. 'Hinduism and Peace Education.' In *Spirituality, Religion and Peace Education*, edited by Jing Lin, Edward J. Brantmeier: Charlotte: Information Age
- Weber, Thomas. 1991. *Conflict Resolution and Gandhian Ethics*. New Delhi: Gandhi Peace Foundation.
- Weber, Thomas. 1996. *Gandhi's Peace Army: The Shanti Sena and Unarmed Peacekeeping*. New York: Syracuse University Press.
- Weber, Thomas. 2006. *Gandhi, Gandhism and the Gandhians*. New Delhi: Lotus Publication.

(2) School of Humanities

(1) Course Title: Scientific Theories of Consciousness – I: Mathematical Methods

Course Instructor: Dr. Nithin Nagaraj, NIAS Consciousness Studies Programme

Credit Hours: Three hours/week (2 hours lecture + 1 hour lab session)

Course Description:

“Scientific Theories of Consciousness-I” is the first course of a two-part series. In “Part-I: Mathematical Methods”, we shall uncover the mathematical foundations that form the bedrock of several scientific theories of consciousness. Understanding ‘consciousness’ remains the final frontier of research and is increasingly becoming an interdisciplinary field of study with ideas and principles borrowed from several mathematical disciplines such as Information Theory, Signal Processing, Time Series Analysis, Chaos Theory, Complexity Measures, Brain Imaging Analysis, Network & Graph Theory. This course will equip the student with mathematical methods required to undertake basic research in scientific theories of consciousness.

Learning Objectives:

The primary objective of this course is to equip the student with the required mathematical methods, principles and techniques in order to undertake research in scientific theories of consciousness which is the subject matter of Part-II of this course to be offered in the next semester. The mathematical skills needed to build, analyze and rigorously evaluate a scientific theory of consciousness will be the key learning of this course.

Pre-requisites for registration/auditing:

Familiarity with elementary set theory and calculus with an interest in mathematics is a must. It is highly recommended that the student be comfortable with any one computer programming language of her choice (MATLAB/Python/C/any-other-equivalent-computer-language). This course will be intensive in mathematical reasoning and programming. Students will solve assignments that involve mathematical and logical thinking (including writing mathematical proofs), as well as writing computer programs as an aid to understanding the mathematical principles.

Expected Student Workload:

There will be a 2-hour lecture session and 1-hour lab session every week. The lecture session will introduce the various mathematical principles. The lab session will involve problem solving, writing mathematical proofs as well as writing computer programs. Assignments (both graded and ungraded, reading and writing) will be given extensively throughout the course.

Course Duration: August-November 2016, Monday 10:30 -12:30 pm, Thursday 3:30 - 4:30 pm.

Lecture Topics and Discussion

Module 1

Introduction to scientific theories of consciousness, methods of science, the role of mathematics in scientific theories with emphasis on its role in cognitive science, neuroscience, and existing scientific theories of consciousness; the unreasonable effectiveness of mathematics, and limits of mathematical reasoning; a bird's eye-view of the various mathematical methods needed for understanding scientific theories of consciousness.

Module 2

Basics of linear algebra: " $y=Ax$ ", the four fundamental spaces of linear algebra, vector spaces and linear transformations, foundations of singular value decomposition and principal component analysis; probability theory basics, introduction to random variables and stochastic processes, Markov processes, linear and nonlinear processes.

Module 3

Time series analysis basics, linear and nonlinear signal processing fundamentals, introduction to the four Fourier representations and its properties, basics of Wavelet transforms, signal processing algorithms used in neuroscience; introduction to non-linear dynamics/chaos theory and its applications in brain imaging analysis. Introduction to advanced techniques such as compressed sensing, signal processing on graphs, and dynamics on networks; basics of biostatistics, hypothesis testing, interpretation of statistical tests, and the role of statistics in scientific theories of consciousness.

Module 4

Introduction to Information Theory and complexity measures, Shannon's coding theorems, role of information theory in the biological sciences (with emphasis to neuroscience and cognitive science), different notions of information (extrinsic, intrinsic, semantic, double-aspect information and quantum information); introduction to various measures of consciousness (such as causal density, neural complexity, differentiation-integration measures of brain complexity and dynamics, perturbational complexity index and others); introduction to Tononi's Integrated Information Theory of Consciousness. Note: These theories will be exhaustively and rigorously dealt in Part-II of the course (to be offered in the next semester).

Basis for Final Grades

Class Participation: 5%

Take-home Assignments: 10% (reading+writing, weekly)

Quiz: 20% (2 quizzes)

Lab assignments: 15%

Mid-term Exam: 20%

Final Exam: 30%

Books and References

This being a foundational mathematical methods course, there is no single text-book. Suitable handouts, papers and references will be provided for each topic. The following books (not exhaustive) are useful as references for the different modules.

Module 1:

Courant, R., Robbins, H., & Stewart, I. (1997). *What is Mathematics? An elementary approach to ideas and methods* (2nd ed.). USA: Oxford University Press.

Module 2:

Strang, G. (2007). *Linear algebra and its applications* (4th ed.). CENGAGE LEARNING (RS).

Papoulis, A., & Pillai, S. U. (2002). *Probability, random variables, and stochastic processes*. Boston: McGraw-Hill.

Module 3:

Haykin, S. S., & Van, V. B. (2002). *Signals and systems*. New York: Wiley.

Kantz, H., & Schreiber, T. (2003). *Nonlinear time series analysis*. Cambridge: Cambridge University Press.

Alligood, K. T., Sauer, T. D., Yorke, & J.A. (2000). *Chaos: An Introduction to Dynamic Systems*. Springer.

Module 4:

Cover, T. M., & Thomas, J. A. (1991). *Elements of information theory*. New York: Wiley.

MacKay, D. J. (2003). *Information theory, inference, and learning algorithms*. Cambridge, UK: Cambridge University Press.

Tononi, G. (2012). *Phi: A voyage from the brain to the soul*. New York: Pantheon.

Oizumi, Masafumi, Albantakis, Larissa, Tononi, & Giulio. (2014). *From the Phenomenology to the Mechanisms of Consciousness: Integrated Information Theory 3.0*. Public Library of Science.

(2) Course Title: Monument-building Traditions in Ancient South India

Course Instructor(s): Dr. Srikumar M. Menon

Credit Hours: Two

Course Description:

The antiquity of monument-building traditions in southern India goes back farther than recorded history, right into the hoary mists of the Neolithic. This course looks at how humankind shaped the landscapes they lived in to create monuments from the earliest times till the early medieval period in south India. It covers the ashmound tradition of the Neolithic, megalithic structures, early religious monuments like stupas and temples. The Harappan civilization is briefly covered to examine possible influence on later architecture in the subcontinent. The production of rock art through the various ages is also covered. The course is also intended to impart basic training in field methods and documentation.

Learning Objectives:

This course is aimed at creating a basic framework to understand the chronological development of monument-building traditions that gave rise to the rich repository of built heritage that is found on the subcontinent today, and to impart a basic skill in documentation, and subsequent understanding, of these to the student. Due to the vast ambit of the course content, each topic is introductory in nature, with leads provided for the interested student to follow up any of these lines of inquiry. The participants in this course are expected to follow up on the reading and online resources which will be provided in the lectures to develop further on the classroom discussions during the rest of the week.

Pre-requisites for registration/auditing:

No prerequisites except a keen interest in understanding history and prehistory first-hand and from relevant literature.

Expected Student Workload:

Two hours of lectures in class, four hours of reading, two hours of perusal of online resources and two hours of writing assignments. Total of 10 hours per week. (Except in the case of the week with the field trip, where 3-4 days need to be set aside.)

Course Duration: August-November 2016

Lecture Topics and Discussion

The main topics of the lectures are as follows:

1. **An Introduction to the Prehistory of the Indian subcontinent:** Outline of the period beginning from the earliest occupation of the landmass till the transition to the Early Historic.
2. **Early Monument Building Traditions and Their Evolution:** An overall look at monuments ranging from the ashmounds of the Neolithic and megaliths to the earliest religious monuments such as stupas, shrines and temples.
3. **The Harappan Civilisation:** A look at the earliest urban civilisation of south Asia, their cities and structures, including graves.
4. **The South Indian Neolithic and the Enigmatic Ashmounds:** An in-depth look at the Neolithic and the changes it brought in prehistoric society and the coeval ashmound tradition.
5. **Megaliths – Monuments of the Iron Age:** A look at the earliest stone monuments of India, the origin and characteristics of this practice and diversity in megalith form, including endemic forms.
6. **The Early Religions of India:** An overall picture of early religious traditions in India and their monumental architecture ranging from rock-cut sanctuaries to structural monuments.
7. **Early Religious Architecture – Buddhist, Hindu and Jain (Part I):** A look at the period of transition from the Iron Age to the Early Historic, and the rich ferment of monument-building traditions, including influence of local traditions on these pan-Indian religions.
8. **Early Religious Architecture – Buddhist, Hindu and Jain (Part II):** An understanding of the structural principles and evolution of monuments like rock-cut sanctuaries, stupas and structural temples.
9. **The Language of Rock Art:** A survey of rock art in the Indian subcontinent from the earliest times to historic times, including attempting to understand the function such art might have fulfilled in early societies, possibly even as early “monuments” in place-making.
10. **The Flowering of Early Temple Architecture in India:** A study of the evolution of temple forms and the contribution of various regional guilds of artisans to the same.
11. **Case Study I:** The Early Chalukyan monuments at Aihole, Badami and Pattadakallu
12. **Case Study II:** The Vijayanagara Empire and the Ruined City at Hampi
13. **Field Methods (Documentation) Part I:** An introduction to the mapping of extent and layout of monuments at site level.
14. **Field Methods (Documentation) Part II:** An introduction to the documenting of individual monuments, 3-D modelling.
15. **Field Trip:** (to one relevant archaeological site close by) 3-4 days.
16. **Summing Up:** Unanswered Questions and Gaps in our Knowledge

Basis for Final Grades

Class participation: 15%

One presentation on assigned topic: 15%

Field trip: 15%

Documentation: 15%

Term paper: 25%

Test: 15%

Books and References

- Allchin, B. and Allchin, R. (1996) *The Rise of Civilization in India and Pakistan*, Cambridge University Press India Pvt. Ltd., New Delhi.
- Cunningham, A. (2009 – reprint) *The Bhilsa Topes: Buddhist Monuments of Central India*, Aryan Books International, New Delhi.
- Hardy, A. (1995) *Indian Temple Architecture: Form and Transformation*, IGNCA/Abhinav Publications, New Delhi.
- Michell, G. (2014) *Temple Architecture and Art of the Early Chalukyas: Badami, Mahakuta, Aihole and Pattadakal*, Niyogi Books, New Delhi.
- Morrison, K. (2009) *Daroji Valley: Landscape History, Place, and the Making of a Dryland Reservoir System*, AIIS/Manohar Books, New Delhi.
- Renfrew, C. (2007) *Prehistory: The Making of the Human Mind*, Phoenix, London.
- Singh, U. (2009) *A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century*, Pearson, Delhi.

(3) Course Title: Conceptual Mathematics

Course Instructor(s): Mr. Venkat Rayudu

Credit Hours: Two

Course Description:

Conceptual Mathematics, the grammar of mathematics, provides a general account of the workings of mathematical methods. The Conceptual Mathematics course provides a first introduction to category theory, which embodies these general principles of calculation common to arithmetic, algebra, calculus, geometry, and logic. Basic concepts of category theory are introduced in a manner comprehensible to a student body of diverse academic backgrounds. Major topics of category theory covered in the course include: sets and functions, category of dynamical systems, structure-preserving maps, universal mapping properties, and definitions of multiplication, addition, and truth.

Learning Objectives:

The main objective of the Conceptual Mathematics course is to demystify mathematics and thereby make mathematical sciences more user-friendly. The present course emphasizes understanding why and how mathematical calculations give the results that they do (e.g. $1 + 2 = 3$). Upon completion of the course, students will have a clear understanding of the basics of extracting the mathematical content of a given subject matter. This course will prepare students for advanced category theoretic studies of mind, consciousness, and cognition - the “Science of Knowing” course offered next semester.

Pre-requisites for registration/auditing:

The course is based on Lawvere and Schanuel’s Conceptual Mathematics textbook, which is addressed to total beginners. The concepts and constructions of category theory are introduced informally in terms of examples drawn from everyday experience. No mathematical training beyond that of high school mathematics is required for registering / auditing the course.

Expected Student Workload:

The course syllabus will be covered in 16 weeks, with one 2-hour lecture per week. Successful completion of the course involves: (i) class participation, (ii) take-home assignments, (iii) class presentation, (iv) in-class exams, and (v) term paper. There will be two in-class exams (mid-term and final), two take-home assignments of exercises from the Conceptual Mathematics textbook, and one class presentation of an exercise selected by the student. The topic of the term paper is also selected by the student and in consultation with the instructor.

Course Duration: August-November 2016

Lecture Topics and Discussion:

The following course lectures are based on the corresponding material in Lawvere and Schanuel's Conceptual Mathematics textbook.

1. Sets and Functions
2. Composition of Functions
3. Types of Functions
4. Functions vs. Figures
5. Definition of Category
6. Structure-Preserving Map
7. Examples of Categories
8. Category of Dynamical Systems
9. Natural Number Object
10. Universal Mapping Property
11. Definition of Product
12. Sums
13. Actions
14. Exponentiation
15. Truth Value Object
16. Logical Operations

Basis for Final Grades:

Class Participation: 5%

Take-home Assignments: 10% (2 x 5)

Class Presentation: 10%

Mid-term Exam: 20%

Term Paper: 25%

Final Exam: 30%

Books and References:

Textbook:

Lawvere, F. W. and Schanuel, S. H. (2009) *Conceptual Mathematics: A First Introduction to Categories* (2nd edn.), Cambridge: Cambridge University Press.

Reference:

Lawvere, F. W. and Rosebrugh, R. (2003) *Sets for Mathematics*, Cambridge: Cambridge University Press.

(4) Course: An Introduction to Consciousness Studies

Topic: Neurophysiology

The goal of neuroscience is to understand how we see, think, feel, and act in terms of the electrical activity of neurons in our brains. The **Neurophysiology** component of the course **An Introduction to Consciousness Studies** introduces various methods of recording electrical activity from neurons. The **Neurophysiology** component consists of four lectures. In Lecture I, we begin with an overview of ion-channels and neurotransmitters. In Lecture II, we study neuronal electrical signaling: synaptic potentials and action potentials. In Lecture III, we will discuss the techniques for recording electrical signals: patch-clamp recording of ionic currents and single-unit recording from the brains of awake-behaving primates. In Lecture IV, we will study applications of these recording methods in neuroscientific investigations of learning and perception. The course lectures are based on selected chapters from the Principles of Neural Science textbook.

Textbook:

Kandel, E. R. *et al.* (2013) *Principles of Neural Science* (5th edn.), New York: McGraw Hill Education.

Chapters:

Nerve Cells, Neural Circuitry, and Behavior, pp. 21-38

Ion Channels, pp. 100-124

Membrane Potential and the Passive Electrical Properties of the Neuron, pp. 126-147

Propagated Signaling: The Action Potential, pp. 148-171

Overview of Synaptic Transmission, pp. 177-188

Synaptic Integration in the Central Nervous System, pp. 210-235

Assignment: Write a review, in the format of *Nature* News and Views / *Neuron* Preview / *Proc. Natl. Acad. Sci. USA* Commentary / *Science* Perspective, of a recent paper--on Neurophysiology --published in *Nature* / *Neuron* / *Proc. Natl. Acad. Sci. USA* / *Science*.

Topic: Vision

Vision research, beginning with the wavelength-tuned cones of color vision and the orientation-selective visual cortical neurons, has been paving the way for neuroscientific investigations of consciousness. Foundational questions of consciousness studies, such as the binding problem, are addressed in terms of the modality of vision. The **Vision** component of the course **An Introduction to Consciousness Studies** consists of four lectures. In Lecture I, we begin with an overview of how our brains construct, based on given visual stimuli, what we see. In Lecture II, retinal processing of visual information is discussed. In Lecture III, orientation-sensitive neurons of the striate cortex and motion direction-sensitive neurons of the middle temporal area are studied in depth. In Lecture IV, neural mechanisms mediating the top-down influences of context, meaning, and memory on visual perception are examined. The course lectures are based on selected chapters from the Principles of Neural Science textbook.

Textbook:

Kandel, E. R. *et al.* (2013) *Principles of Neural Science* (5th edn.), New York: McGraw Hill Education.

Chapters:

The Constructive Nature of Visual Processing, pp. 556-576

Low-Level Visual Processing: The Retina, pp. 577-601

Intermediate-Level Visual Processing and Visual Primitives, pp. 602-620

High-Level Visual Processing: Cognitive Influences, pp. 621-637

Assignment: Write a review, in the format of *Nature News and Views* / *Neuron Preview* / *Proc. Natl. Acad. Sci. USA Commentary* / *Science Perspective*, of a recent paper--on Vision--published in *Nature* / *Neuron* / *Proc. Natl. Acad. Sci. USA* / *Science*.

(5) Course Title: Cartography for Heritage Study: GIS and its antecedents

Course Instructor(s): Dr. M.B.Rajani

Credit Hours: Two

Course Description:

Course will include brief historical development of map making; geodesy: understanding important terms and concepts that govern mapping (such as projection, datum, ellipsoid, scale, coordinate systems etc); map reading; Satnav: technology and applications, practical demonstration and exercises in using Satnav and applying the information to generate maps; Use of remote sensing (satellite imagery) for mapping; Introduction to GIS software, digitizing geospatial information, handling multi layer geospatial data, generating maps using GIS software. This course will also look at some maps of past times and explore its use for cultural heritage studies.

Learning Objectives:

- Understand the core concepts and functions of Cartography
- Enhance professional skills and knowledge about the principals involved in cartography
- Understand the accuracies associated with the contemporary digital cartography and GIS
- Examining old maps (such as survey maps, portolan charts, drawing) the methods used in making them
- Recognizing and extracting spatial information from old maps and understanding them in current context and assessing its use for cultural heritage of the mapped region

Pre-requisites for registration/auditing: No

Expected Student Workload: Seven hours

Course Duration: August-November 2016.

Lecture Topics and Discussion

1	Introduction	Dodge et al. Chapter 1, 2, 5
2	History of Cartography	Robinson et al. Chapter 3+
3	Geodesy-1Earth coordinates and datum;Scales	Robinson et al. Chapter 4+
4	Geodesy-2Map projectionsand coordinate systems	Robinson et al. Chapter 5, 6 +
5	Evaluation-1: Participants' presentations on cartographic topic/principals	
6	Cartographic data sources-1Ground Survey and positioning	Robinson et al. Chapter 7
7	Digital cartographic information anddigitizing maps	Robinson et al. Chapter 10 & 11+

8	Symbolization of features attributes as points lines and areas	Robinson et al. Chapter 19, 20,21, 25, 26
9	Cartographic data sources-2Aerial and space remote sensing;3D visualization	Robinson et al. Chapter 8 Dodge et al. Chapter 7, 8, 9, 10
10	Evaluation-2: Field techniques (GPS Survey)	
11	Old maps and their uses	TBA
12	Ptolemy's world maps	TBA
13	Portolan charts	TBA
14	British maps of cities	TBA
15	Mughal city maps	TBA
16	Evaluation-3: Term paper and presentation	

Basis for Final Grades

Final grade will be out of 50 (50-40=A; 40-30=B; 30-20=C; 20-10=D; 10-0=E)

1.	Evaluation-1	Based on content, presentation skills and innovation in presentations	10
2.	Evaluation-2	Field techniques: Based in data collected, documented and recorded for specific application	10
3.	Evaluation-3	Term paper submission	10
		Term paper presentation	10
4.	Class participation	Attendance in session	10

Books and References

Text book:

Elements of Cartography, John Wiley and Sons, INC, 6th edn. 2009. Singapore. By Arthur H. Robinson, Joel L. Morrison, Philip C. Muehrcke, A. Jon Kimerling and Stephen C. Gump (eds.). ISBN: 978-81-265-2454-9

Reference Books:

Geographic Visualization: Concepts tools and applications, John Wiley and Sons Ltd., England, 2008. By Martin Dodge, Mary McDerby and Martin Turner.

Berggren, J. Lennart and Jones, Alexander, *Ptolemy's Geography: An annotated translation of the theoretical chapters*, Princeton University Press, Princeton, NJ, (2000).

Blake, J., *The Sea Chart: The Illustrated History of Nautical maps and Navigational Charts*. Conway Maritime Press, London (2004)

Gole, Susan, *Maps of Mughal India : drawn by Colonel Jean-Baptiste-Joseph Gentil, agent for the French Government to the Court of Shuja-ud-daula at Faizabad, in 1770*, (1988)

Gole, Susan, *Indian Maps and Plans*, Cambridge University Press; First Edition edition (January 12, 2010)

(6) Course Title: Cultural Heritage Studies (Core course for Heritage Prog.)

Course Instructor(s): Prof. Sharada Srinivasan, Dr. M.B.Rajani, and Dr. Srikumar Menon

Credit Hours: Three

Course Description:

Course will include lectures and field studies on basics of heritage studies in the South Indian context and also basics on multidisciplinary research areas covered in NIAS heritage programme

Learning Objectives:

- History and art-history of South India
- Basics of aerial and space remote sensing applications for landscape archaeology
- An Introduction to Megalithic Culture in the Indian Context
- Introduction to Archaeomaterials, Archaeological science and Heritage

Pre-requisites for registration/auditing: No

Expected Student Workload: 10 hours

Course Duration: August-November 2016

Lecture Topics and Discussion

		Instructor	Reading
1	Basics of megalithic culture in South India	Srikumar Menon	Gururaj Rao 1970
2	Forms, Types and classification of Megaliths	Srikumar Menon	Moorti 1998
3	Megaliths in their landscapes	Srikumar Menon	Morrison
4	Field trip to nearby Megalithic site	Srikumar Menon	-
5	History of aerial and space image applications to archaeology	M.B.Rajani	Bradford 1954, Wilson, 2000
6	Crop mark, soil Mark, shadow mark Identification and interpretation	M.B.Rajani	Bradford 1954, Wilson, 2000
7	Case studies	M.B.Rajani	Rajani, 2016
8	Emerging technologies	M.B.Rajani	
9	Archaeological sciences and material culture	Sharada Srinivasan	Smith, Scott, Linda Hurcombe Agrawal and Kharakwal Biswas and Biswas, Carla Sinopoli

10	Ethnoarchaeology and crafts history	Sharada Srinivasan	VibhaTripathi, Sharada Srinivasan A.K Coomaraswamy, History of Technology, INSA, VijayaRamaswamy
11	Archaeometallurgical production landscapes: iron and steel	Sharada Srinivasan	Craddock, Sharada Srinivasan and Ranganathan, Balasubramaniam, D.K Chakrabarti,
12	Art of Cholas: technical art history and bronze casting	Sharada Srinivasan	Sharada Srinivasan, Dehejia, Nagaswamy Sivaramamurti
13	History of South India	Sharada Srinivasan Tutorial	NilakantaSastri
14	Early history and art of Karnataka	Sharada Srinivasan Tutorial	P.B. Desai, George Michell and John Fritz, B.V. K Sastri
15	Visit to Chitrakala Parishad	Sharada Srinivasan (Field visit)	
16	Visit to Venkatappa Art Gallery	Sharada Srinivasan (Field visit)	
17	Term paper submission/evaluation		

Basis for Final Grades

Final grade will be out of 50 (50-40=A; 40-30=B; 30-20=C; 20-10=D; 10-0=E)

1.	Term paper	Based on specific topic selected by participant in discussion with one of the instructor	25
2.	Field	Field participation	15
3.	Class participation	Attendance in session	10

Books and References

Detailed bibliographic reference and will be provided in due course

(3) School of Natural & Engineering Sciences

(1) Course title: Basic Primatology

Course Instructor(s): Prof. Sindhu Radhakrishna

Course level: 001

Credit hours: Three

Course description This course is designed as a primer to the study of primates. The main goals of the course are to demonstrate the theoretical underpinnings of primatological research, the methodologies involved in conducting primate studies and the science behind conserving primates. A combination of approaches – lectures, laboratory demonstrations and field exercises – will be used to address the various topics. Students will not only obtain training in field skills that are crucially required to carry out a primate study, but will also learn how to analyse and understand research findings against a theoretical background. This course is thus an exhaustive preparation for students to carry out independent research investigations in primatology in the future.

Program modules: Introduction to Primatology; Field Methods; Laboratory Methods; Primates in Communities; Primate Conservation.

Course schedule: August– November 2016

Mode of evaluation: Class assignments, Review paper, Paper presentation (oral)

Topic
Introduction to the Course February, Contact hour : 1 hr
Module 1: Primates Primer
Teaching Mode : Assignments based on reading
Primate Diversity and Biogeography
Primate Origins
Primate Ecology & Behaviour
Primate Social Systems
Primate Reproductive Biology
Primate Cognition and Culture

Module 2: Studying Wild Primates
Teaching Mode : Oral lectures & Field exercises
March; Contact hours : 16 hrs
Primate Survey Techniques
Vegetation Sampling
GIS and Mapping Techniques
Time-Activity Budgets
Module 3: Living Together
Teaching Mode : Oral lectures
March ; Contact hours : 3 hrs
Primate Communities
Primate Coevolutionary Relationships
Module 4: Laboratory Methods
Teaching Mode : Oral lectures, Facility visits, Laboratory demonstrations
March; Contact hours : 18 hrs
Genetic Research in Primatology
Studying Captive Primates
Behavioral Experiments on Captive Primates
Module 5: Am I My Brother's Keeper?
Teaching Mode : Oral lectures, Open discussions
April; Contact hours: 5 hours
Primate-Human Interactions
Threats to Primates
Ethical Treatment of Primates
Primate Conservation Strategies
Wrap-Up Sessions
April; Contact hours: 3 hrs
Paper Presentations
Paper Presentations

(2) Course Title: Mathematical Methods

Level of course: 200

Number of credits: Three

Type of paper (lecture, seminar, guided reading, etc.): Guided reading

Name of instructor(s): Dr. Janaki Balakrishnan

Brief description:

Basic mathematical concepts will be introduced which are useful for interpretation of results in the context of real life situations. Topics covered (from various branches of mathematics) will include basic topics in linear algebra, matrices, refresher topics in complex numbers, curve fitting, linear and polynomial regression, maxima & minima, differential and integral calculus, ordinary differential equations and their applications. The course is intended for students without adequate exposure to mathematical methods, but who are desirous of learning these.

Prerequisites, if any: None

Probable starting date and schedule/timings: August, 2016.

(3) School of Social Sciences

(1) Course Title: Perspectives in Education Research

Instructor: Dr. Shivali Tukdeo

Credit Hours: Two

Course Description:

This course is primarily designed for students entering the education programme at NIAS. Depending on the intake of students working in education, the course will be conducted in lecture/reading format. The main purpose of the course is to introduce students to the central texts in education research. We will begin with the disciplinary history of education and move on to focus on historical, philosophical, social and cultural aspects of studying education.

Course Duration: August to November 2016, Tuesday, 2:00 to 4:00 pm

Schedule:

1. Introduction: What does it mean to do research in education?
 - What is philosophy of education?
 - 'Good' and 'bad' in education
 - The idea of school and university: Education and the ideal State

2. Philosophy of Education (II)
 - Purpose and Goals (Reading: Immanuel Kant: *Thoughts on Education*)
 - Teaching, Learning, Dialogue (Reading: John Dewey: *Democracy and Education*)

3. Historical Perspectives (I)
 - Ancient Indian, Egyptian and Greek systems of education
 - History of reading and writing
 - Institutional formation
 - Development of secular institutions of learning
 - History of teaching, testing, certification

4. Historical Perspectives (II)
 - Reading education through Indian national movement
 - Education and nationalism
 - Education and the modern state

5. Social Perspectives (I)
 - Equality, Rights, Inclusion, Alienation, Domination
 - Caste, class, gender
 - Questions of language/identity
 - Politics of public education in India

6. Social Perspectives (II)

Curriculum, pedagogy, instruction
Education and Citizenship
Post-independence trends

7. Psychological Perspectives (I)

Biological/social/environmental
Acquisition, learning, development stages
Cognition
Learning theories

8. Psychological Perspectives (II)

Experience, intelligence, skills, performance, measurement
Learning to learn, teach, evaluate, administer
Obedience, dominance; education and 'the normal'

9. Policy Research in Education

Structures and systems; policy-actors, processes
Policy history of education in India
Principles of policy analysis

(2) Course Title: The agrarian to non-agrarian transition in India

Course Instructor(s): Prof. Narendar Pani

Credit Hours: Three

Course Description:

This is a seminar course on India's transition from an agrarian economy to a non-agrarian one. The students will be expected to present seminars on specific topics that trace this transition.

Learning Objectives:

The course is designed to help PhD students gain a firmer foothold in the literature on the transition from an agrarian economy to a non-agrarian one.

Pre-requisites for registration/auditing: None required

Expected Student Workload: 10 hours per week

Course Duration: August-November 2016

Lecture Topics and Discussion

	Topic	Readings
1	Political economy of India	India's Political Economy The Gradual Revolution (1947-2004) Francine Frankel
2.	Mahalanobis and The Second plan	The Second Plan (Original Plan Document) Krishnamswamy, K.S.(1959), "India's Second Plan: The Background" <i>Economic Development and Cultural Change</i> , University of Chicago Press Nurkse, R. (1957). "Reflections on India's Development Plan", <i>The Quarterly Journal of Economics</i> , Oxford Journals Myrdal, Gunnar.(1969)."Asian Drama OR The review Article buMahalanobis

3.	Green Revolution	Griffin, K. (1974). "The Political Economy of Agrarian Change: An Essay on the Green Revolution" Shiva, Vandana (1991). "The Violence of Green Revolution: Third World Agriculture, Ecology and Politics". Zed Books Bardhan, P (1970) "Green Revolution and Agriculture Labourers" Economic and Political Weekly T.J. Byres (1972): "The Dialects of India's Green Revolution"
4.	Punjab and the Rise of Regionalism	Bal, G(2005) "Violence, Migration and Entrepreneurship: Punjab during the Khalistan Movement" Economic and Political Weekly Dyke, V.(2009) "The Khalistan Movement in Punjab, India, and the Post-Militancy Era: Structural Change and New Political Compulsions". <i>Asian Survey</i> Jodhka et.al (2001). "Looking back at the Khalistan Movement", Economic and Political Weekly
5	Kerala Model of Development	Sen, Amartya (1998) "Development as Freedom" Kannan, K.P (2004)"Development as a Right to Freedom: An Interpretation of the 'Kerala Model'" Kurien, J(1995). "The Kerala Model: Its Central Tendency and the. Outlier", Social Scientist Pani, Narendar and Jafar, K (2010)"Mass Education-led Growth and Non-agrarian Villages: Long-term Results of the Kerala Model" Oxford Development Studies Ravi Raman, K(2010) "Development, Democracy and the State: Critiquing the Kerala Model of Development", Routledge Publication
6	Liberalisation	Part A of Manmohan Singh's 1991 Budget speech + Sen, Abhijeet (1992) "Economic Liberalisation and Agriculture in India". Social Scientist
7	Trade and Foreign Exchange	Bhagwati & Srinivas(), Foreign Trade Regimes and Economic Development in India
8	Transition from agriculture	The Transition from Feudalism to Capitalism: the Dobb - Sweezy Debate Dobb, Maurice(1974)." Studies on Development of Capitalism" Sen, A (1966) "Peasants and Dualism with or without surplus labour", Journal of Political economy Lerche, J(1998) "Agricultural labourers, the State and agricultural transition in Uttar Pradesh", Economic and Political Weekly
9	Agrarian Systems	Gough, Kathleen(1981). Rural Society in South East India, Cambridge University Press

		<p>Kodoth, Praveena (2004), Gender, Property Rights and responsibility of farming in Kerala, Economic and Political Weekly</p> <p>Bardhan, P and Rudra. (1978) “Inter-linkage of land, labour and credit relations: An analysis of village survey data in East India”, Economic and Political Weekly</p> <p>Thorner and Thorner (1962), Land and Labour in India, Asia Publication House</p> <p>Hirashima(2008). “The land market in development: a case study of Punjab in Pakistan and India”. Economic and Political Weekly</p>
10	Land reforms	<p>Vol 6 of Land Reforms in India Series</p> <p>Gill,S(1989) “Changing land relations in Punjab and implications for land reforms” Economic and Political Weekly</p> <p>Varghese, T.C (1970). “Agrarian change and economic consequences. Land tenures in Kerala 1850-1960.</p> <p>Pani, N(1983),Reforms to pre-empt change: land legislation in Karnataka</p>
11	Ecological History	<p>Gadgil,M and Guha, R(1993). “This Fissured Land: An Ecological History of India”, University of California Press</p>

Basis for Final Grades:

Class participation	20 %
Class presentation	30 %
Term paper	50 %

(3) Course Title: Psychology of Learning and Personality

Course Instructor: Dr. Shalini Dixit

Credit Hours: Two

Course Description:

Development of a child and the process of teaching-learning dwells upon the psychology of receiving knowledge, processing, retaining and reproducing/ recreating knowledge and applying all this in the day-to-day life. In our day-to-day interactions, as well as researchers, we try to figure out psychologies of each other. To assist each other in that this course will give introduction to the basic psychological principles involved in learning and the nature of impact a personality has on the learners, i.e. all the children and adults.

Learning Objectives:

At the end of the course work the takers should be able to:

- Understand the principles of various psychological approaches
- Be able to draw from psychological theories to look at any real life situation
- Apply critical understanding of psychological theories to find solutions towards day-to-day situations and educational reform

Pre-requisites for registration/auditing: Observation and sensitivity towards human conditions

Expected Student Workload:

Students will have 2 hours lecture/contact hours each week, along with 5 hours for reading, exploring, thinking reflecting and writing.

Course Duration: August-November 2016

Lecture Topics and Discussion:

Psychology for Living and Learning: This section gives an introduction of psychology as a discipline. The focus would remain on giving a foundational understanding of what are the different approaches used by which Psychologists understand, explain and predict human behavior.

Perspectives on Learning and Cognition: This section looks at major learning theories such as Skinner, Bandura, Piaget, Vygotsky, Bruner and Cole. Taking a critical look at how some of these theories have influenced the major teaching-learning practices, possibilities of a shift in the practices are discussed.

Perspectives on Motivation: Human learning and development is largely a result of the intensity and direction of his/her motivation. Motivation can be self driven or a result of parents and teacher's expectancy. In the light of the theories given by Bandura, Maslow, McClelland, and Ryn and Deci the dynamics of motivation are addressed in this section.

Personality Development: ‘How do we come to be what we are, as a person’ is a question addressed by various personality theories. Understanding them is important for understanding of our socialization and educational process. This section deals with some major views on development of personality.

Basis for Final Grades

Out of the 2.0 credits following would be division of credits

- 0.5 for classroom participation in terms of critical engagement with the readings, getting additional information and insights about the topic under discussion,
- 1.0 for a written assignment
- 0.5 for end-term exam

(The format of assignment may change depending upon student’s requirement)

Tentative Reading List

Rogoff, B (2003) *The Cultural Nature of Human Development*. Oxford University Press

Cole, M; Engestrom, Y. and Vasquez, O (1997) *Mind Culture and Activity*. Cambridge University Press

Bandura, A. (1997) *Self Efficacy: The exercise of Control*. New York: Freeman

Bruner, J S (1996) *Culture of Education*. Cambridge, MA: Harvard University Press

Hall, C; Lindzey, G and Campbell, J.B (1998) *Theories of Personality*. Wiley: New Delhi

Olson, David. (2003) *Psychological Theory and Educational Reform*. Cambridge University Press

Lawrence Erlbaum, Mishra, G and Mohanty, A. K (2002) *Perspectives on Indigenous Psychology*, New Delhi: Concept

Moore, A (2002) *Teaching and Learning: Pedagogy, Curriculum and Culture*. London: Routledge

Saraswathi, T.S. (ed) (1999) *Culture, Socialization and Human Development: Theory, Research and Applications in India*. Sage: New Delhi

Sikdar, S. 2012. Who is a child? *The Hindu*. June 15, 2012 08:36 IST (web access: <http://www.thehindu.com/news/national/article3528624.ece>)

Siegler, R. & Alibali, M.W. (2005). *Children’s thinking*. (4th ed.). Prentice Hall

(4) Course title: Practices of Indian Democracy: deficits, dreams and contentious politics

Course Instructor: Prof. Bishnu N. Mohapatra

Number of lectures: Six lectures (total lecture-time - 12 hours)

Course Description:

Indian democracy continues to baffle its critics as well as its admirers. For its admirers, it has come to stay as an embodied practice, and within its short career it has dented India's traditional social fabric forever. To its critics, in its current form, particularly in its electoral rendition, it remains far from the core ideals of democracy. It is necessary that a critical understanding of Indian democracy must stay clear from polarized points of view. Drawing from several academic disciplines, the course deals with conceptual as well as empirical questions connected to the practices of democracy in India.

Duration of the course: Three weeks in August

Themes of the lectures:

First lecture: How to make sense of democratic practice in India?

Second Lecture: How to understand democratic practice through history and its perceptible shifts?

Third Lecture: Interaction between India's pluralism and its democratic order

Fourth lecture: Minority question in India

Fifth lecture: Development, civil society and democracy

Sixth lecture: Democracy in neo-liberal times

Pre-requisite for registration: No prior training in social science is necessary although a critical attitude towards social reality will be an asset

Evaluation: Class participation and one essay on the themes covered in the lectures (1500 words)



Articles, Essays, Books and Proposals

Effective Research Writing

2016

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