NATIONAL INSTITUE OF ADVANCED STUDIES
COURSE OFFERINGS
Second Semester-January to April 2019

School of Conflict and Security Studies

(1)Course title: Global Politics: Contemporary World Affairs

Subject/ discipline: Interdisciplinary

Level of course: MA/Mphil/PhD Scholars

Number of credits: Three

Type: Online and Offline Lectures, Workshops, Presentations, Writings and Guest Lectures

Name of the instructor: D. Suba Chandran

Probable starting date and schedule/ timings: 8 January 2019, Tuesday, 1000-1300 hrs

I
Global Politics:
Contemporary World Affairs

An Introduction

Probable starting date and schedule/ timings

The course provides an introduction to contemporary world affairs. The primary objective of the course is two – first, to enhance the understanding of contemporary global developments, with an attempt to comprehend the larger picture. Second, to identify trends leading forecasts on contemporary world affairs.

The Course will also invite senior scholars within and outside NIAS – also from within and outside India to provide lectures on contemporary world affairs.

Research Questions on Global Politics
The course focus on providing an explanation, and expects the scholars to increase their understanding on the following:
1. **Contemporary World Order**: Policies of the US, China, EU and Russia and their implications on the global order
2. **Big Power Politics**: US-China, US-Russia, Russia-China, and India-China

3.   **Regional Politics**: South Asia, Southeast Asia, East Asia, Middle East and Europe
4.   **Maritime Order**: South China Sea, Indian Ocean, Arctic, Blue Economy etc
5.   **Contemporary Global Issues**: Climate Change, International Trade, Outer Space, Nuclear Order etc

Special Focus on South Asia
The Course aims to create an understanding from a South Asian perspective. Given the enormity of literature, primarily from an international perspective, there is a substantial gap in terms of approaching contemporary global issues from a South Asian perspective.

The course also aims to create a pool of scholars, thereby build capacity that would help the region in understanding issues of global politics, regional and international conflicts and also regional security in South Asia.

Enhancing Presentation Style & Writing Skills
A common issue facing young scholars is the challenge of effective communication. This course aims to address the same in terms of building basic skills of research presentation.

On the basic research tools side, the course aims to pick up different contemporary issues and make presentations – oral and power point, with an objective to convert the same into short writings to be published in the Course Portal

Effective Use of Social Media for Dissemination
The course will also recommend its scholars to maintain their own individual blogs and also help improving their tweets and related social media communication; the objective of this endeavour is to create awareness about making effective use of the social media for research and dissemination.

The course also aims to create a group of young scholars working on issues relating to peace and conflict, and pool them together with an online identity.

Online Portal: Global Politics
The Course will also have an Online portal managed by the Course Instructor, where the writings of the scholars on contemporary world affairs will be published on a regular basis.

The Online portal of the Course will also have lectures by the international faculty uploaded.

Course Outline
Global Politics: Identifying Contemporary Issues

The course focuses on providing an explanation, and expects the scholars to increase their understanding on the following:

1. Contemporary World Order:
- Policies of Big Power: US, China, EU, Russia and India
- Institutionalism and World Politics: Role of International and Regional Organisations-

2. Regional Security:
- South Asia
- Southeast and East Asia
- West Asia
- Europe
- Latin America
- Africa

3. Maritime Security:
- South China Sea
- Indian Ocean
- Indo-Pacific
- Arctic
- Blue Economy

4. Science and Security:
- Energy Politics
- Climate Change
- Outer Space
- Nuclear Order and Disarmament
- Cyber Security
- Drones and Internal Security

5. International Economy and Security:
- Globalism and Economic Diplomacy: G7-G20 Summits
- International Economic and Financial Organisation- WTO, World Bank
- Trade and Conflict
- Regional Economic Integration

III
Methodology

For the NIAS scholars, there will be regular classes, every Wednesdays between 1000 and 1300 hrs.

Every session would involve 45 minutes of lecture, followed by 45 minutes of interactions.

The above will be followed by students' presentations for 90 minutes

Student Presentations, followed by Short Commentaries will play a crucial role in deepening the understanding of students. Each student will be asked to make minimum two presentations and write two short commentaries every month.

The portal on Global Politics will engage the students of the course on a regular basis in following subjects on a daily basis and also prepare online databases.

Guest Lectures and International Faculty:
Since the course is also designed as an online one, this would give flexibility to invite faculty from across the world.

Academics, Think Tankers, former government officials will be requested to take guest lectures on specific subjects.

School of Humanities

(1)Course Title: Learning In The Presence Of Noise

Course Instructor: Nithin Nagaraj, Consciousness Studies Programme, NIAS

Subject/Discipline: Learning theory/A.I./Signal Processing

Level of Course: Advanced

Number of Credits: Two (Contact hours: 2+1 hrs/week)

Type: Guided Reading

Course Description: Noise is ubiquitous. Noise can have adverse and devasting effects in the performance of information processing and learning algorithms. In this course, we shall explore ways in which noise can be modelled and its effect mitigated, especially for information processing and learning algorithms. Stochastic resonance – the phenomenon where an optimal amount of noise in specific nonlinear systems enhances signal detection, will also be discussed. The role of chaos in information processing and learning in the presence of noise will be explored.

Pre-requisites for registering: Students must have registered for the reading course that was offered last semester: "Topics in Information Theory, Learning and Causal Inference". Since the papers that will be discussed are quite mathematical in nature, the student is expected to be comfortable with mathematical thinking and arguments. Term project will involve writing computer programs, hence familiarity with programming in MATLAB and Python is a must. Auditing this course is not allowed.

Expected Student Workload: 2 hours of guided reading with 1 hour of discussion every week. Apart from this, the student is expected to spend at least 6-7 hours every week in reading research papers/books, writing computer programs and working out mathematical proofs.

Course Duration: January – May 2019 (starting date: Jan. 7th, 2019)

Topics for Discussion: Stochastic resonance, chaotic resonance, chaotic neural signal multiplexing and de-multiplexing, $1/f$ and $1/f^{\alpha}$ noise, modelling noisy channels, effect of noise in neural networks, modelling a noisy neuron, chaos inspired neuronal model, Brownian ratchets, Parrando's Paradox and its variations/generalizations, measuring SNR at a single neuron in the brain, Approximation theorem, Universal computation, Neural signal multiplexing in the presence of noise using compressed sensing, information processing and computation in the presence of noise, distinguishing between noise and chaos, surrogate analysis, Low SNR computation.

Assignments & Evaluation Criteria:
Reading assignment of research articles, book chapters, journal papers; In-class interactions and discussions, individual and group presentations; Critical analysis and writing a term report on a research topic/project. Evaluation will be based on all of the above.

Reading List:
This is not a complete list, but only indicative. Full list will be given once the course begins.

1. MacKay, D. J. (2003). *Information theory, inference and learning algorithms*. Cambridge university press.
2. Shannon, C. E. (1948). A mathematical theory of communication. *Bell system technical journal*, *27*(3), 379-423.
3. Shannon, C. E. (1949). Communication in the presence of noise. *Proceedings of the IRE*, *37*(1), 10-21.
4. Zhang, C., Bengio, S., Hardt, M., Recht, B., & Vinyals, O. (2016). Understanding deep learning requires rethinking generalization. *arXiv preprint arXiv:1611.03530*.
5. Gammaitoni, L., Hänggi, P., Jung, P., & Marchesoni, F. (1998). Stochastic resonance. *Reviews of modern physics*, *70*(1), 223.
6. Moss, F., Pierson, D., & O'GORMAN, D. A. V. I. D. (1994). Stochastic resonance: Tutorial and update. *International Journal of Bifurcation and Chaos*, *4*(06), 1383-1397.
7. Mori, T., & Kai, S. (2002). Noise-induced entrainment and stochastic resonance in human brain waves. *Physical review letters*, *88*(21), 218101.
8. Kitajo, K., Nozaki, D., Ward, L. M., & Yamamoto, Y. (2003). Behavioral stochastic resonance within the human brain. *Physical Review Letters*, *90*(21), 218103.
9. Hidaka, I., Nozaki, D., & Yamamoto, Y. (2000). Functional stochastic resonance in the human brain: noise induced sensitization of baroreflex system. *Physical review letters*, *85*(17), 3740.
10. McDonnell, M. D., & Abbott, D. (2009). What is stochastic resonance? Definitions, misconceptions, debates, and its relevance to biology. *PLoS computational biology*, *5*(5), e1000348.
11. Faure, P., & Korn, H. (2001). Is there chaos in the brain? I. Concepts of nonlinear dynamics and methods of investigation. *Comptes Rendus de l'Académie des Sciences-Series III-Sciences de la Vie*, *324*(9), 773-793.
12. Korn, H., & Faure, P. (2003). Is there chaos in the brain? II. Experimental evidence and related models. *Comptes rendus biologies*, *326*(9), 787-840.
13. Czanner, G., Sarma, S. V., Ba, D., Eden, U. T., Wu, W., Eskandar, E., ... & Brown, E. N. (2015). Measuring the signal-to-noise ratio of a neuron. *Proceedings of the National Academy of Sciences*, 201505545.
14. Tishby, N., Pereira, F. C., & Bialek, W. (2000). The information bottleneck method. *arXiv preprint physics/0004057*.
15. Almeida, J., Peralta-Salas, D., & Romera, M. (2005). Can two chaotic systems give rise to order?. *Physica D: Nonlinear Phenomena*, *200*(1-2), 124-132.
16. Bucolo, M., Caponetto, R., Fortuna, L., Frasca, M., & Rizzo, A. (2002). Does chaos work better than noise?. *IEEE Circuits and Systems Magazine*, *2*(3), 4-19.
17. Abbott, D. (2001). Overview: Unsolved problems of noise and fluctuations. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, *11*(3), 526-538.
18. Nagaraj, N., & Sahasranand, K. R. (2016, June). Neural signal multiplexing via compressed sensing. In *Signal Processing and Communications (SPCOM), 2016 International Conference on* (pp. 1-5). IEEE.

19. Harmer, G. P., Abbott, D., Taylor, P. G., & Parrondo, J. M. (2001). Brownian ratchets and Parrondo's games. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, *11*(3), 705-714.
20. McGovern, P. E., Glusker, D. L., Moreau, R. A., Nuñez, A., Beck, C. W., Simpson, E., ... & Stout, E. C. (1996). Losing strategies can win by Parrondo's paradox. *Nature*, *381*, 480-481.
21. Yamins, D. L., & DiCarlo, J. J. (2016). Using goal-driven deep learning models to understand sensory cortex. *Nature neuroscience*, *19*(3), 356.
22. Marblestone, A. H., Wayne, G., & Kording, K. P. (2016). Toward an integration of deep learning and neuroscience. *Frontiers in computational neuroscience*, *10*, 94.
23. Kathpalia, A., & Nagaraj, N. (2019). A Novel Compression Based Neuronal Architecture for Memory Encoding. In International Conference on Distributed Computing and Networking (ICDCN '19).

(2) Course Title: GIS for spatial data visualization and analysis

Course Instructor(s): M.B.Rajani (mbrajani.nias@gmail.com)

Course level: Beginners

Credit Hours: Two

Course Description:

GIS is a powerful tool for organizing, visualizing and analysing any data which has a geo-spatial component. It therefore has applications in a variety of domains. This course will emphasize the applications of GIS for various sub-topics under the broad fields of culture and society. It will discuss several case studies, with lectures by the instructor and guest lectures by other experts, focusing on methodologies and resulting outcomes. Students will receive guidance to undertake a research project as part of this course, where they must investigate spatial components of data in their chosen domains. These findings will be discussed in seminars, as part of the course. Participants have to bring their own laptops

Probable starting date: Second week of January 2019

(3) Course title: **Coastal Geomorphology**

Level of course: Introductory

Number of credits: Two

Type: (lecture, seminar, guided reading, etc): Lecture, Field investigation / Field Survey

Name of instructor(s): Dr. Asmita Mohanty (geoasmitamohanty@gmail.com)

Brief description:

The course applies the knowledge of the coastal process, sea-level changes, coastal landforms, geospatial techniques towards coastal geomorphology, and cases studies from the Indian coast. It starts with the basic concept of the structure of the Earth, and Ocean basin topography found in the ocean basin. Then the various processes involved in the formation of coastal landforms and the concept of sea level change are discussed. In addition, advancement of remote sensing technique for coastal studies, and various case studies related to morphological changes along the Indian coast are presented. The topics covered are of an introductory and brief discussion type.

Geomorphology involves the study of the landforms of the earth surface formed by various geological agents, especially those that lead to the erosion, transport, and deposition of sediments. The coastal geomorphology is the study of the morphological advancement and evolution of the coast. The study of coastal geomorphology is therefore on the morphology of the coastal zone and on processes such as wind, waves, tides, and currents that act along the coast to create the features as distinct, such as high rock cliffs, swales, sandy beach, and dune systems etc. This course provides an introduction to coastal geomorphology and greatly influenced by other fields/discipline, especially fluvial, aeolian, and tectonic geomorphology, seismology, climate change, remote sensing, dating technique and there is a common set of paradigms, instrumentation, and methodology.

Probable starting date: February 2019 (Exact date/time will be announced)

SCHOOL OF NATURAL SCIENCES AND ENGINEERING

(1)Course Title: Energy and Environment Policy

Number of credits: One (One 90-minute class per week)

Name of instructor(s): R Srikanth

Brief description:

This course focusses on key aspects of India's Energy and Environment Policies and Statutes which have a significant bearing on India's Electricity sector as we transition to a more sustainable energy mix.

All NIAS and/or IISc students are welcome to take the course and submit their final term paper covering an assigned area related to Energy and Environment.

Learning objectives:

(i)   Sustainable Development Goals with specific reference to Energy
(ii) To understand the contribution of various sources of electricity generation in India
(iii) To grasp the intricacies of the ongoing transition to a more sustainable mix.
(iv) To understand the key statutes and policies of India in the Energy and Environment.
(v)   Electric Vehicles – Challenges and Prospects for India.

Pre-requisites for registering:

Interest in Sustainable Development in general, and in the Power Sector in particular

Study Materials in the form of references will be provided during the course.

Probable starting date: Wednesday, 9th January 2019 at 2 pm

School of Social Sciences

(1)Course Title: Ontology of Indian Development

Course Instructor(s): Prof Narendar Pani

Credit Hours: Three

Course Description: The course will try to capture what it is to be a part of India's development process. It will explore the processes that have led to Indian development being what it is. It will piece this picture together using inputs from philosophy, economics, sociology, politics and post-Independence Indian history.

Learning Objectives:
The main objective of the course is to enable students to understand India's development process as it is, rather than what one ideology or the other insists it should be.

Pre-requisites for registration/auditing: An open mind and a willingness to read extensively.

Expected Student Workload: Ten hours a week including 3 hours of classes.

Course Duration: January - April 2019

Lecture Topics and Discussion
Session 1. Philosophical influences on Indian development
Session 2. Impact of philosophical conflicts at Independence: When legality contradicts morality
Session 3. Nehruvian separation: Mahalanobis and backward agriculture
Session 4. Closed window to the world: Fighting comparative advantage
Session 5. Ideology, identity and inequality: Education, aspirations and revolutions
Session 6. Unequally Green revolution: Internal migration and the challenge of majoritarianism.
Session 7. New capital and the rise of regional identities: Consolidation of policies by stealth
Session 8. Globalization and liberalization: Reforming to stay afloat
Session 9. WTO, Indian Budgets and the making, and breaking, of financial markets
Session 10. Urbanization, location and regional disparities: The rise of Census towns
Session 11. Ontology of knowledge in India
Session 12. Ontology of institutions in India
Session 13. The limits to growth: High growth and low human development
Session 14. Ontological status of India's development
Session 15. Student presentations

Basis for Final Grades
20% of the evaluation will be based on class discussions.
80% of the evaluation will be based on the final presentations.

Books and References
References will come up during the course of discussion in class.

Probable starting date: Second week of January 2019

(2) Course title: **The Craft of Ethnography**

Subject/ discipline: Social Science/Education

Level of course: Ph.D

Number of credit (s): One

Type: Guided Reading, Seminar & Discussion

Name of instructor(s): Jeebanlata Salam

Probable starting date: January 14 (Monday)

Timings: 3.30 PM to 5.00 P.M.

Brief Description:
The course "The Craft of Ethnography" in dissertation writing is designed to train research students who opt to follow rigorous qualitative research analysis in data interpretation of their field based research data. In the course, students will be trained how to use qualitative methods in conducting field studies/lived experiences while advanced students who have completed/are completing empirical research will be engaged in building a firmly grounded skills in applying ethnographic knowledge in the structural organisation and interpretation of field raw data/information.

References:

- Carspecken, Phil Francis.1996. A Critical Ethnography in Educational Research. New York: Routledge
- Geertz, Clifford. 1973. The Interpretation of Cultures. New York. Basic Books
- --------------------.1993. Local Knowledge. New York. Basic Books
- Lewis, M. Ioan.1999. Arguments with Ethnography: Comparative Approaches to History, Politics & Religion. London & New Brunswick. The Athlone Press.
- Malike, C. Ramesh and Eswarappa, Kasi (Eds).2009. Theory and Practice of Ethnography. Rawat Publishers.
- Epstein, A.L (Ed).1967: The Craft of Social Anthropology. Social Science Paperbacks in association with Tavistock Publications. USA
- Malinowski, B. 1922. Argonauts of the Western Pacific. London: Routledge and Kegaun Paul.
- Montgomery,W. and Benson, Stephen.2018. Writing the Field: Recording, Sound, Word and Environment. Edinburgh University Press Ltd.
- O'Reilly, Karen.2012. Key Concepts in Ethnography. Sage Publications
- Ramaswamy,E.A and Srinivas, M.N.2002. The Fieldworker and the Field. Oxford University Press
- Srinivas, M.N. 2002. Collected Essays. Delhi: Oxford University Press
- Sluka, A. Jeffrey and Robben, CGM Antonius.2007. Ethnographic Field work. Willy-Blackwell
- Whyte, W.F. 1955. Street Corner Society. Chicago: University Press