

<b>Course title:</b> Seminar Course in Global Change				
<b>Course code:</b> NRE 102	<b>No. of credits:</b> 3	<b>L-T-P:</b> 0-45-0	<b>Learning hours:</b> 45	
<b>Pre-requisite course code and title (if any):</b> No pre-requisite required				
<b>Department:</b> Energy and Environment				
<b>Course coordinator:</b>		<b>Course instructors:</b> Dr Chubamenla Jamir/ Dr. Kamna Sachdeva		
<b>Contact details:</b> Chubamenla.Jamir@terisas.ac.in/ Kamna.Sachdeva@terisas.ac.in				
<b>Course type:</b> Elective in ESRM and Core in CSP		<b>Course offered in:</b> Semester 3		
<b>Course Description</b>				
<p>This 3-credit course is intended to expose student to issues broader than the ones they will be studying as part of their curriculum</p> <p>The purpose of a seminar-based course is to lift them, briefly, out of the sector-wise approach, out of the labels that they have been dealing with, to show them the “big picture”, and allow them to see links between the determinants of the complex phenomenon of global change. The expected outcome is a better developed perspective on global change and not just climate science.</p> <p>The approach planned is one of self-discovery/learning without the teacher as the centre of the learning, through prescribed readings chosen to provoke thought and reflection; discussion with specialists in selected topics; and participation in interactive sessions attended and moderated by two or more faculty members from within the TERI SAS.</p> <p>Students will also be directed and encouraged to look at videos and other kinds of multimedia material on the internet so that their knowledge is current and has a broad base. This, again, can be done by discussions between the teacher and students.</p>				
<b>Course objectives</b>				
<b>Course content</b>				
<b>Module</b>	<b>Topic</b>	<b>L</b>	<b>T</b>	<b>P</b>
1.	Presentation Introduction of concept of global Environmental change and nd discussion on its interdisciplinarity aspects. Presentations on topics selected by students in consonance with coordinator. Presentations can be for thirty minutes followed by discussions and questions. (Time budgeted for preparation and presentation)		12	
2.	Seminar with faculty from within TERI School of Advanced Studies/ TERI It is proposed to have seminars attended/moderated by faculty members from Department or from outside drawn from across the TERI SAS and TERI. The three papers to be discussed will be provided to both, student and faculty, in advance. Insights, participation, thoroughness of reading, and ability to associate/link across topics and compartments will be assessed. (three sessions lasting 2 hours each are planned = 6 hours).		6	

	Note: Students and faculty will be told in advance about the requirements and will therefore be prepared for this mode of evaluation.			
3.	Seminar with external expert External faculty will be invited for an hour-long presentation/talk, and 30-45 minutes of discussion. Name tags will be provided for the students and experts will be asked to evaluate participation, quantitatively and qualitatively.		7	
4.	Paper summary and commentary Summary and comments on two research papers. These will be submitted by the student to the course coordinator. The summaries will be evaluated on the basis of criteria which will be circulated to them in advance. (10 hours per paper x 2 papers per student for reading and summarizing = 20 hours). Each student will be given different papers to summarize and comment upon. These papers can be given to the student at the beginning of the semester so as to allow enough time.		20	
	<b>Total</b>		<b>45</b>	
<b>Evaluation criteria</b>				
<ul style="list-style-type: none"> <li>• Test 1: 15% (Presentations from module 1)</li> <li>• Test 2: 30% (term paper from internal faculty presentations along with commentary on selected topic)</li> <li>• Test 3: 20% (term paper from external faculty seminars with discussion)</li> <li>• Test 4: 30% (presentation covering all the topics covered in the module 2 and module 3 plus research papers summary presentation)</li> <li>• Attendance/adherence to deadlines: 5% (class participation and deadlines of assessment submissions)</li> </ul>				
<b>Learning outcomes</b>				
<ul style="list-style-type: none"> <li>• Better developed perspective on global change and complex issues linked to the theme (Test 1 to 4)</li> <li>• Students will be exposed to issues broader than the ones they will be studying as part of their curriculum (Test 1 to 4)</li> </ul>				
<b>Pedagogical approach</b>				
Discussions on novel topics, self-reading, research papers reading and seminars with internal and external faculty				
<b>Additional information (if any)</b>				
<b>Readings</b>				
<ol style="list-style-type: none"> <li>1. <b>The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?</b> Will Steffen, Paul J. Crutzen and John R. McNeill, <i>Ambio</i>, Vol. 36, No. 8 (Dec., 2007), pp. 614-621</li> <li>2. <b>Can Technology Spare the Earth?</b> Jesse H. Ausubel, <i>American Scientist Magazine</i> 84(2):166-178, March-April 1996.</li> <li>3. <b>Defusing the global warming time bomb</b>, James Hansen, <i>Science</i>, 297, 5579, 2002</li> <li>4. <b>Earth system governance' as a crosscutting theme of global change research</b>, Frank</li> </ol>				

Biermann, **Global Environmental Change** 17, 326–337, 2007

5. **On the Life Cycle metaphor: where ecology and economics diverge**, Robert U Ayres, Working Paper 2002/119/EPS/CMER, **Centre for the Management of Environmental Resources**, INSEAD, France
6. **Planetary Boundaries: Exploring the Safe Operating Space for Humanity**, Johan Rockström, Will Steffen, Kevin Noone, Åsa Persson, F. Stuart III Chapin, Eric Lambin, Timothy M. Lenton, Marten Scheffer, Carl Folke, Hans Joachim Schellnhuber, Björn Nykvist, Cynthia A. de Wit, Terry Hughes, Sander van der Leeuw, Henning Rodhe, Sverker Sörlin, Peter K. Snyder, Robert Costanza, Uno Svedin, Malin Falkenmark, Louise Karlberg, Robert W. Corell, Victoria J. Fabry, James Hansen, Brian Walker, Diana Liverman, Katherine Richardson, Paul Crutzen, and Jonathan Foley, **Ecology and Society** 14(2): 32, 2009
7. **Resilience, adaptability and transformability in social–ecological systems**, Walker, B., C. S. Holling, S. R. Carpenter, and A. Kinzig, **Ecology and Society** 9(2): 5, 2004
8. **Science for Global Sustainability: Toward a New Paradigm**, William C. Clark, Paul J. Crutzen, and Hans J. Schellnhuber, CID Working Paper No. 120 March 2005 Science, **Environment and Development Group, CID at Harvard University**, Center for International Development, Working Papers
9. **Sustaining Sustainability: Creating a Systems Science in a Fragmented Academy and Polarized World**, John D. Sorman, MIT Sloan School of Management, Forthcoming in M. Weinstein and R. E. Turner, eds., **Sustainability Science: The Emerging Paradigm and the Urban Environment**. Springer
10. **Assessing the water challenge of a new green revolution in developing countries**, Johan Rockstrom, Mats Lannerstad, and Malin Falkenmark, Stockholm Environment Institute, Stockholm Resilience Centre, Kraftriket 2, SE 10691, **Proceedings of the National Academy of Sciences**, 104, 15, 6253–6260, 2007
11. **Abrupt Climate Change**, R. B. Alley, et al., **Science** 299, 2005

**Additional information (if any):** separate information sheet related to external seminars will be provide to students in advance

**Student responsibilities**

The students are expected to submit assignments in time and come prepared with readings when provided