

## HANDBOOK

**AB-203, ARCTIC ENVIRONMENTAL MANAGEMENT**

SPRING 2012

**Objective:** To provide comprehensive knowledge of management systems, legal framework and challenges pertaining to utilisation of natural resources and the environmental situation in the Svalbard region. Development of management strategies and practice is presented against a background of knowledge about geophysical and biological processes and constraints characterising this part of the Arctic. The course is designed for students who wish to include Arctic environmental conservation and management of natural resources as part of their professional training.

**Content:** The course focuses on the following areas:

**I. Institutions and legal framework**

- Structure, legal basis and fields of responsibilities for institutions involved in the management of Arctic natural resources
- Norwegian policy, The Svalbard Treaty, international conventions, and legal regulations as a framework for managerial rule in the Svalbard region)

**II. Physical environment and ecosystems**

- Basic information on the Arctic geophysical environment, ecosystems and natural resources.

**III. Utilisation of natural resources**

- Human presence in the Arctic, activity and relations to the environment and utilisation of natural resources.

**IV. Challenges and risks**

- Challenges and conflict scenarios relating to resource management in the high Arctic.
- Environmental strategies, encroachment analysis and assessment systems for ecological key components relating to environment and resource management.

The course provides facts and information on a variety of issues within the main concerns mentioned, and introduces students to procedures, methods and technology central to environmental monitoring and management planning. Students will also carry out practical and/or theoretical exercises to be reported on a group basis.

<b>Credits:</b>	15ECTS
<b>Duration:</b>	one term
<b>Teaching:</b>	Approx. 70 hours lectures, 25 hours seminars / workshops / field excursions.
<b>Evaluation:</b>	Written; 5 hours (80% of evaluation) & assessed presentation (20%).
<b>Literature:</b>	see <a href="http://www.unis.no">http://www.unis.no</a> for course literature

**Responsible for the course:**





Dr. Steve Coulson,  
room B230  
Tel. 3334

[steve.coulson@unis.no](mailto:steve.coulson@unis.no)






**Calendar 2012:**

part of the one-year programme





**Lecturers AB:203 Spring 2011**

Lecturer	Picture	Institution		
Aars, Jon		NP	Norsk Polarinstitutt - The Norwegian Polar Institute	<a href="mailto:jon.aars@npolar.no">jon.aars@npolar.no</a>
Andresen, Steinar		UiO / FNI	Universitetet i Oslo - The University of Oslo / Fridtjof Nansen Institute	<a href="mailto:steinar.andresen@fni.no">steinar.andresen@fni.no</a>
Brekke, Harald		NPD	Norwegian Petroleum Directorate	<a href="mailto:Harald.Brekke@npd.no">Harald.Brekke@npd.no</a>
Coulson, Steve		UNIS	The University Centre in Svalbard	<a href="mailto:steve.coulson@unis.no">steve.coulson@unis.no</a>





**Lecturers AB:203 Spring 2011**

Lecturer	Picture	Institution		
Gabrielsen, Geir Wing		NP	Norsk Polarinstitut - The Norwegian Polar Institute	<a href="mailto:geir.wing.gabrielsen@npolar.no">geir.wing.gabrielsen@npolar.no</a>
Gjørseter, Harald		HI	Havforskningsinstituttet - Institute of Marine Research	<a href="mailto:harald.gjoesaeter@imr.no">harald.gjoesaeter@imr.no</a>
Herstad, Bente		Norad		<a href="mailto:behe@norad.no">behe@norad.no</a>
Humlum, Ole		UiO / UNIS	Universitetet i Oslo - The University of Oslo	<a href="mailto:ole.humlum@unis.no">ole.humlum@unis.no</a>
Kovacs, Kit		NP / UNIS	Norsk Polarinstitut - The Norwegian Polar Institute	<a href="mailto:kit.kovacs@npolar.no">kit.kovacs@npolar.no</a>




**Lecturers AB:203 Spring 2011**

Lecturer	Picture	Institution		
Malte Jochmann		SNSK	Store Norske Spitsbergen Kullkompani	<a href="mailto:malte.jochmann@snsk.no">malte.jochmann@snsk.no</a>
Potts, Tavis		SAMS	Scottish Association for Marine Sciences	<a href="mailto:tavis.potts@sams.ac.uk">tavis.potts@sams.ac.uk</a>
Espen Stokke		SpS	Sysselmannen på Svalbard – Governor of Svalbard.	<a href="mailto:espen.stokke@sysselmannen.no">espen.stokke@sysselmannen.no</a>
Quillfeldt Cecilie H. von		NP	Norsk Polarinstitutt - The Norwegian Polar Institute	<a href="mailto:cecilie.quillfeldt@npolar.no">cecilie.quillfeldt@npolar.no</a>
Reiersen, Lars-Otto		AMAP	Arctic Monitoring and Assessment Programme	<a href="mailto:lars-otto.reiersen@amap.no">lars-otto.reiersen@amap.no</a>
To be announced		SpS	Sysselmannen på Svalbard – Governor of Svalbard.	

**Lecturers AB:203 Spring 2011**

Lecturer	Picture	Institution		
Sand, Gunnar		UNIS	The University Centre in Svalbard	<a href="mailto:gunnar.sand@unis.no">gunnar.sand@unis.no</a>
Sander, Gunnar		NPI	Norsk Polarinstitutt - The Norwegian Polar Institute	<a href="mailto:gunnar.sander@npolar.no">gunnar.sander@npolar.no</a>
Svenning, Martin		NINA	Norsk institutt for naturforskning - Norwegian Institute for Nature Research	<a href="mailto:martin.Svenning@nina.no">martin.Svenning@nina.no</a>
Søvik, Guldborg		HI	Havforskningsinstituttet - Institute of Marine Research	<a href="mailto:guldborg.soevik@imr.no">guldborg.soevik@imr.no</a>

**Lecturers AB:203 Spring 2011**

Lecturer	Picture	Institution		
Ulfstein, Geir		UiO	Universitetet i Oslo - The University of Oslo	<a href="mailto:geir.ulfstein@jus.uio.no">geir.ulfstein@jus.uio.no</a>
Vigdis Hole		LL	Longyearbyen Lokalstyret – Longyearbyen town council	<a href="mailto:vigdish@lokalstyre.no">vigdish@lokalstyre.no</a>
Walløe, Lars		UiO	Universitetet i Oslo - The University of Oslo	<a href="mailto:lars.walloe@medisin.uio.no">lars.walloe@medisin.uio.no</a>

## COURSEWORK

The coursework consists of a 30 minute presentation (20-25 minutes plus 10 minutes discussion) to be given on an arctic topic. Students will work in groups of three and will be expected to show evidence of information collected from internet / library and interviews with people living in Longyearbyen. **Topics MUST be selected before Monday 30<sup>th</sup> January** and presentations to be held **10<sup>th</sup> and 11<sup>th</sup> May**.

## ASSESSMENT

- 80% Written examination. Examination will consist of a written paper to be sat **Monday 21<sup>st</sup> May**.
- 20% Presentation.

## FIELD EXCURSIONS



**Villmarkssenter:** Wednesday 15<sup>th</sup> February 18:00 – 22:00)  
Dinner will served at Villmarkssenteret and hosted by Berit and Karl. Both have lived in Longyearbyen since the 1970's and operate an environmentally friendly tourist company. A brief history of Svalbard will be presented and there will be time to question Berit and Karl about their views on the development of Longyearbyen and tourism in Arctic regions.

### **SvalSat**

A trip to the Svalsat ground station to understand the reasons for locating the principle earth observation satellite ground station so far in the High Arctic. To be arranged.



### **Barentsburg**

Interview with the Russian Consul General. Russian politics and attitudes to exploitation of the Arctic. To be arranged

## Lectures

Note:-

a) The lecture descriptions are only guides to the content of the lecture

b) Due to scheduling considerations it is not possible to arrange the lectures in the most logical order also that lectures can cover more than one theme (i.e. a) institutions and legal framework, b) physical environment and ecosystems, c) utilisation of natural resources or d) challenges and risks)

<b>Title and content</b>
<p><b>The AB-203 course - objectives and plan.</b></p> <ul style="list-style-type: none"> <li>• Course outline</li> <li>• Timetable</li> <li>• Reading list and assessment</li> </ul> <p><i>Steve Coulson, UNIS.</i></p>
<p><b>Spatial planning in Longyearbyen.</b></p> <ul style="list-style-type: none"> <li>• Area of authority</li> <li>• History of development</li> <li>• Aims and challenges</li> <li>• Technical infrastructure</li> </ul> <p><i>Lecturer: Vigdis Hole, LL</i></p>
<p><b>Spatial planning in Longyearbyen.</b></p> <ul style="list-style-type: none"> <li>• Unique environmental conditions</li> <li>• Longyearbyen Development Plan</li> <li>• Cultural Monuments</li> <li>• Future of Longyearbyen</li> </ul> <p><i>Lecturer: Vigdis Hole, LL</i></p>
<p><b>The Svalbard Environmental Act, - a framework for human activity and nature conservation.</b></p> <ul style="list-style-type: none"> <li>• why another law for nature conservation ?</li> <li>• principles and objectives</li> <li>• jurisdiction</li> <li>• relations to other laws and regulations</li> <li>• nature conservation and commercial activity on Svalbard</li> <li>• enforcement policy</li> </ul> <p><i>Lecturer: The Governor on Svalbard, SMS,</i></p>
<p><b>Management of the environment, natural resources and cultural heritage in the Svalbard region.</b></p> <ul style="list-style-type: none"> <li>• administrative structure and role of the Governor on Svalbard's office</li> <li>• relationships to other governmental bodies</li> <li>• fields of responsibilities</li> <li>• legal basis</li> <li>• specific regulations</li> <li>• strategies and priorities in nature management on Svalbard</li> <li>• resource monitoring and utilization, new perspectives on resources in the Svalbard region</li> </ul>

<b>Title and content</b>
<ul style="list-style-type: none"> <li>• science and education on Svalbard, -a meeting ground for international co-operation</li> <li>• incentives and instrumental factors in Norwegian policy on Svalbard in recent years</li> <li>• perspectives and challenges in the near future</li> </ul> <p><b>Lecturer: The Governor on Svalbard, SMS,</b></p>
<p><b>Legal issues pertaining to environmental and resource management at three geographical levels: the polar regions, the Arctic and Svalbard</b></p> <ul style="list-style-type: none"> <li>• development and principles relating to legal rule in polar regions</li> <li>• political and economic perspectives on the legal framework</li> <li>• international conventions, - principles and significance</li> </ul> <p><b>Lecturer: Geir Ulfstein, UiO,</b></p>
<p><b>Legal issues pertaining to environmental and resource management at three geographical levels: the polar regions, the Arctic and Svalbard</b></p> <ul style="list-style-type: none"> <li>• the Svalbard Treaty</li> <li>• the Antarctic Treaty and ATS</li> <li>• the Mining Code</li> </ul> <p><b>Lecturer: Geir Ulfstein, UiO,</b></p>
<p><b>Legal issues pertaining to environmental and resource management at three geographical levels: the polar regions, the Arctic and Svalbard</b></p> <ul style="list-style-type: none"> <li>• territorial waters and the 200-mile zone</li> <li>• utilization of natural resources - legal implications</li> </ul> <p><b>Lecturer: Geir Ulfstein, UiO</b></p>
<p><b>Environmental pollutants in the Arctic, - sources and transport routes.</b></p> <ul style="list-style-type: none"> <li>• pollution sources - distant and local</li> <li>• transport patterns in air and water</li> <li>• specific pollutants</li> <li>• qualitative and quantitative trends in pollution</li> </ul> <p><b>Lecturer: Geir Gabrielsen, NP</b></p>
<p><b>Accumulation and biological effects of pollutants in Arctic food chains.</b></p> <ul style="list-style-type: none"> <li>• species and populations exposed to pollution</li> <li>• concentrations and accumulation in individuals</li> <li>• pollution transfer patterns in food webs</li> </ul> <p><b>Lecturer: Geir Gabrielsen, NP</b></p>
<p><b>Accumulation and biological effects of pollutants in Arctic food chains.</b></p> <ul style="list-style-type: none"> <li>• effects on individuals and population demography</li> <li>• mitigation and protection measures</li> <li>• international initiatives to control and reduce pollution</li> </ul> <p><b>Lecturer: Geir Gabrielsen, NP</b></p>
<p><b>Arctic bird fauna - ecological functions and conservation challenges from a resource perspective.</b></p> <ul style="list-style-type: none"> <li>• species and populations</li> <li>• niche adaptations and ecological functions</li> <li>• seasonal abundance and productivity aspects</li> </ul> <p><b>Lecturer: Geir Gabrielsen, NP</b></p>
<p><b>Arctic bird fauna, - ecological functions and conservation challenges from a resource perspective.</b></p> <ul style="list-style-type: none"> <li>• species interactions and resource competitions</li> </ul>

Title and content
<ul style="list-style-type: none"> <li>• threat-scenarios and conservation measures</li> <li>• utilization and harvest potentials</li> </ul> <p><b>Lecturer: Geir Gabrielsen, NP</b></p>
<p><b>Lecture: Inland waters in the Arctic, - limnology in lakes and rivers</b></p> <ul style="list-style-type: none"> <li>• distribution of lakes and rivers</li> <li>• physical and chemical characteristics</li> </ul> <p><b>Lecturer: Martin Svenning, NINA</b></p>
<p><b>Inland waters in the Arctic, - limnology in lakes and rivers</b></p> <ul style="list-style-type: none"> <li>• seasonal dynamics in water masses</li> <li>• nutrients and productivity</li> <li>• primary production and food webs</li> </ul> <p><b>Lecturer: Martin Svenning, NINA</b></p>
<p><b>Freshwater-fish resources on Svalbard.</b></p> <ul style="list-style-type: none"> <li>• species and populations</li> <li>• distribution and adaptive characteristics</li> <li>• intra - populations interactions</li> <li>• trophic structures</li> </ul> <p><b>Lecturer: Martin Svenning, NINA</b></p>
<p><b>Freshwater-fish resources on Svalbard.</b></p> <ul style="list-style-type: none"> <li>• management strategies and harvest potential</li> </ul> <p><b>Lecturer: Martin Svenning, NINA</b></p>
<p><b>Integrated management of the marine environment of the Barents Sea and the sea areas off the Lofoten islands (management plan)</b></p> <ul style="list-style-type: none"> <li>• The management plan, framework and remit.</li> <li>• Background and formation of the plan.</li> <li>• Aim of the plan.</li> </ul> <p><b>Lecturer: Cecilie von Quillfeldt, NP</b></p>
<p><b>Integrated management of the marine environment of the Barents Sea and the sea areas off the Lofoten islands (management plan)</b></p> <ul style="list-style-type: none"> <li>• Functioning and monitoring.</li> </ul> <p><b>Lecturer: Cecilie von Quillfeldt, NP</b></p>
<p><b>Svalbard and the High Arctic in the international context</b></p> <ul style="list-style-type: none"> <li>• UNIS in general</li> <li>• Collaboration in Arctic scientific research</li> <li>• The expanding research in Svalbard</li> <li>• Research and tourism</li> <li>• UNIS related projects</li> <li>• The future of research in the arctic</li> </ul> <p><b>Gunnar Sand, UNIS.</b></p>
<p><b>The Arctic Council and Arctic Monitoring and Assessment Programme.</b></p> <ul style="list-style-type: none"> <li>• International cooperation in the Arctic with special focus on the Arctic Council. Barents Council, Northern Forum, Nordic Council of Ministers UNEPs global interest, AMEC, IASC, AOSB, SEARCH.</li> </ul> <p><b>Lecturer: Lars-Otto Reiersen, AMAP</b></p>
<p><b>The Arctic Council and Arctic Monitoring and Assessment Programme.</b></p> <ul style="list-style-type: none"> <li>• International cooperation in the Arctic with special focus on the Arctic Council. Barents Council, Northern Forum, Nordic Council of Ministers UNEPs global interest, AMEC, IASC, AOSB, SEARCH.</li> </ul> <p><b>Lecturer: Lars-Otto Reiersen, AMAP</b></p>

<b>Title and content</b>
<p><b>The Arctic Council and Arctic Monitoring and Assessment Programme.</b></p> <ul style="list-style-type: none"> <li>• International cooperation in the Arctic with special focus on the Arctic Council. Barents Council, Northern Forum, Nordic Council of Ministers UNEPs global interest, AMEC, IASC, AOSB, SEARCH.</li> </ul> <p><i>Lecturer: Lars-Otto Reiersen, AMAP</i></p>
<p><b>Coal mining on Svalbard: Commercial, industrial and environmental challenges.</b></p> <ul style="list-style-type: none"> <li>• how it all began</li> <li>• coal deposits, - characteristics, utilization and potentials</li> <li>• required infrastructure and technology</li> <li>• production processes</li> <li>• Svalbard coal -energy carrier or industrial raw material</li> <li>• markets and economy</li> </ul> <p><i>Lecturer: Malte Jochmann, SNSK</i></p>
<p><b>Coal mining on Svalbard: Commercial, industrial and environmental challenges.</b></p> <ul style="list-style-type: none"> <li>• political and commercial incentives for the mining industry on Svalbard</li> <li>• pollution and environmental challenges associated with coal mining in the Arctic</li> <li>• future perspectives</li> </ul> <p><i>Lecturer: Malte Jochmann, SNSK</i></p>
<p><b>Marine mammal populations in the Arctic, -demography, productivity and ecological interactions.</b></p> <ul style="list-style-type: none"> <li>• specific populations</li> <li>• abundance and population development</li> </ul> <p><i>Lecturer: Kit Kovacs, UNIS/NP</i></p>
<p><b>Marine mammal populations in the Arctic, -demography, productivity and ecological interactions.</b></p> <ul style="list-style-type: none"> <li>• niche adaptations</li> <li>• ecological functions and significance</li> </ul> <p><i>Lecturer: Kit Kovacs, UNIS/NP</i></p>
<p><b>Marine mammal populations in the Arctic, -demography, productivity and ecological interactions.</b></p> <ul style="list-style-type: none"> <li>• conservation and resource perspectives</li> </ul> <p><i>Lecturer: Kit Kovacs, UNIS/NP</i></p>
<p><b>Management and harvest of Arctic seal populations.</b></p> <ul style="list-style-type: none"> <li>• population size and development</li> <li>• distribution and seasonal movements</li> <li>• trophic interactions and ecological significance</li> <li>• monitoring and productivity assessment</li> <li>• relationships to fisheries</li> <li>• time series and historical catch data</li> </ul> <p><i>Lecturer: Kit Kovacs, UNIS/NP</i></p>
<p><b>Management and harvest of Arctic seal populations.</b></p> <ul style="list-style-type: none"> <li>• management regimes and resource exploitation</li> <li>• conflict scenarios</li> </ul> <p><i>Lecturer: Kit Kovacs, UNIS/NP</i></p>
<p><b>The polar bear as an ecological element and environmental indicator</b></p> <ul style="list-style-type: none"> <li>• population development and distribution</li> <li>• physiological adaptation</li> </ul>

Title and content
<ul style="list-style-type: none"> <li>• demography</li> </ul> <p><i>Lecturer: Jon Aars, UNIS/NP</i></p>
<p><b>The polar bear as an ecological element and environmental indicator</b></p> <ul style="list-style-type: none"> <li>• social organization and behavior</li> <li>• food resources and ecological niches</li> <li>• threat-scenarios to individuals and populations</li> </ul> <p><i>Lecturer: Jon Aars, UNIS/NP</i></p>
<p><b>Polar bear populations - challenge and case for international management cooperation.</b></p> <ul style="list-style-type: none"> <li>• circumpolar distribution and characteristics of populations</li> <li>• migration patterns</li> <li>• physical and anthropogenic threats to habitats and populations</li> <li>• legal conservation efforts</li> <li>• circumpolar management regimes and priorities</li> </ul> <p><i>Lecturer: Jon Aars, UNIS/NP</i></p>
<p><b>Climate in the high Arctic as a framework for biological systems, past and present</b></p> <ul style="list-style-type: none"> <li>• the effects of oceans and ocean currents</li> <li>• solar radiance and energy balance</li> <li>• atmospheric structure and pressure systems</li> <li>• seasonality in weather conditions</li> <li>• ice distribution and drift</li> <li>• turbulence and small scale processes</li> <li>• tidal forcing</li> </ul> <p><i>Lecturer: Ole Humlum, UNIS/ UiO</i></p>
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<p><b>Marine fish resources and fisheries in the Norwegian and Barent's sea.</b></p> <ul style="list-style-type: none"> <li>• pelagic production system</li> <li>• food chains and trophic interactions</li> </ul> <p><i>Lecturer: Harald Gjøsæter, HI</i></p>
<p><b>Marine fish resources and fisheries in the Norwegian and Barent's sea.</b></p>

Title and content
<ul style="list-style-type: none"> <li>• stock biology and population interactions</li> <li>• fishery history</li> <li>• environmental variation and effects on fish recruitment</li> </ul> <p><b>Lecturer: Harald Gjøsæter, HI,</b></p>
<p><b>Marine fish resources and fisheries in the Norwegian and Barent's sea.</b></p> <ul style="list-style-type: none"> <li>• management systems and decision processes</li> <li>• future prospects for management and sustainable harvest</li> </ul> <p><b>Lecturer: Harald Gjøsæter, HI</b></p>
<p><b>Marine invertebrate resources in the Arctic.</b></p> <ul style="list-style-type: none"> <li>• species and populations</li> <li>• adaptation and habitat distribution</li> <li>• ecological significance and trophic interactions</li> <li>• productivity and potential for utilization</li> <li>• harvest development and practice</li> <li>• commercial interests and management regulations</li> </ul> <p><b>Lecturer: Guldborg Søvik, FF</b></p>
<p><b>Marine invertebrate resources in the Arctic.</b></p> <ul style="list-style-type: none"> <li>• species and populations</li> <li>• adaptation and habitat distribution</li> <li>• ecological significance and trophic interactions</li> <li>• productivity and potential for utilization</li> <li>• harvest development and practice</li> <li>• commercial interests and management regulations</li> </ul> <p><b>Lecturer: Guldborg Søvik, HI</b></p>
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<p><b>Population assessment and monitoring of marine resources as a basis for management and exploitation.</b></p> <ul style="list-style-type: none"> <li>• Species-specific methods</li> <li>• adapted technologies</li> <li>• data capture and processing</li> <li>• time series and empirical information</li> <li>• application procedures for scientific information in resource management</li> </ul> <p><b>Lecturer: Guldborg Søvik, HI</b></p>
<p><b>Philosophy of environmental management</b></p> <ul style="list-style-type: none"> <li>• Interpretations of environmental protection – complete protection versus sustainable development</li> </ul> <p><b>Lecturer: Bente Herstad, Norad</b></p>
<p><b>Philosophy of environmental management</b></p> <ul style="list-style-type: none"> <li>• Practical and ideological consequences</li> <li>• Considerations in developing protection plans</li> </ul>

<b>Title and content</b>
<i>Lecturer: Bente Herstad, Norad</i>
<p><b>Philosophy of environmental management</b></p> <ul style="list-style-type: none"> <li>• Changes in appreciation of environmental protection – historical perspective</li> </ul> <p><i>Lecturer: Bente Herstad, Norad</i></p>
<p><b>International Law, Policy and the Environment: An Overview</b></p> <ul style="list-style-type: none"> <li>• outline the history, role and development of international law in mediating environmental problems at the level of the Nation state</li> <li>• the interaction between international law and domestic policy making</li> <li>• the difference between soft and hard law and respective applications</li> <li>• links between science and policy making. It will clarify ‘how international law works’,</li> <li>• how policies are formed, and draw upon several case studies of international law in action e.g. UNFCCC, CITES, Convention on Biodiversity and UNCLOS.</li> <li>• The limitations of international law will be explored as will be the emergence of non-state governance mechanisms.</li> </ul> <p><i>Lecturer: Tavis Potts, SAMS</i></p>
<p><b>International Law, Policy and the Environment: the Marine Environment</b></p> <ul style="list-style-type: none"> <li>• Regulations that manage fisheries, mineral exploitation, international shipping, and maritime territory have evolved through international mechanisms, cooperation and conflict between states.</li> <li>• Often solutions to many marine issues lie at the international scale e.g. migratory fisheries, border disputes or climate change.</li> <li>• This lecture will examine the evolution of the key international agreements that cover the marine environment such as UNCLOS, MARPOL, UN FSA, CBD, and the regional seas agreements.</li> </ul> <p><i>Lecturer: Tavis Potts, SAMS</i></p>
<p><b>Political Geography of the Arctic</b></p> <ul style="list-style-type: none"> <li>• How is the Arctic managed?</li> <li>• the history, evolution and role of Arctic agreements such as the Arctic Environmental Protection Strategy and the Arctic Council.</li> <li>• The interaction and tension between international cooperation and unilateral action will be discussed as will be the unique issues that face the region in terms of international law, maritime boundaries and the role of nations and major stakeholder groups.</li> <li>• The controversial idea of an Arctic treaty will be discussed and debated.</li> </ul> <p><i>Lecturer: Tavis Potts, SAMS</i></p>
<p><b>Workshop: The Future of the Arctic (mini-lecture and briefing for group work).</b></p> <ul style="list-style-type: none"> <li>• Examine the variety of ‘futures’ that exist for the management of the Arctic in terms of governance, conservation and sustainable development.</li> <li>• Debate surrounding the development of an Arctic ‘treaty’ and what scenarios are likely given the current political trajectory.</li> </ul> <p><i>Lecturer: Tavis Potts, SAMS</i></p>
<p><b>Workshop: Roleplay exercise – an International Negotiation.</b></p> <ul style="list-style-type: none"> <li>• the pressures, issues and pros and cons of negotiating collective agreements in the Arctic amongst different groups.</li> <li>• A range of stakeholders will be established which will include non government organisations (WWF or Greenpeace), National Governments (representing the Arctic states), indigenous representatives, scientific bodies,</li> </ul>

<b>Title and content</b>
<p>the EU, and industry representatives. The format will follow the structure of an actual conference with a plenary session with stakeholder ‘speeches’ (no more than 5 mins per group), a ‘corridor session’ over coffee, and a roundtable negotiation. Finally there will be an attempt to negotiate a UNIS Declaration on the Future of the Arctic.</p> <p><i>Lecturer: Tavis Potts, SAMS</i></p>
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<p><b>The Industrialisation of the Arctic</b></p> <ul style="list-style-type: none"> <li>• Anthropocentric climate change is changing the Arctic and its physical and social systems. This is leading to a range of opportunities for increased exploitation and development and the risks of environmental degradation in the region.</li> <li>• Changes induced by a warming climate with a focus on sea ice dynamics and debates over future sea ice extent, the renewed interest in the Arctic by the international community</li> <li>• Focus on the incidents of September 2007 that combined a record minimum with the placing of a flag on the North Pole by Russia.</li> <li>• A brief overview will be given of the major industrial sectors that are active or proposed in the Arctic region.</li> <li>• Examine in detail the major sectors active in the Arctic the future of these sectors in a warming climate. The oil and gas industry, Arctic navigation and tourism, and fishing and living resources.</li> <li>• Each case study will focus on current sectoral activity and possible future scenarios. The ramifications of future activities will be discussed.</li> </ul> <p><i>Lecturer: Tavis Potts, SAMS</i></p>
<p><b>Environmental and technological challenges related to exploitation of oil and gas in the European Arctic.</b></p> <ul style="list-style-type: none"> <li>• localization of oil and gas resources</li> <li>• climate conditions</li> <li>• ice and permafrost on land</li> <li>• off-shore conditions</li> <li>• technology in exploration and exploitation</li> <li>• environmental challenges</li> </ul> <p><i>Lecturer: Per Johan Brandvik, UNIS</i></p>
<p><b>Environmental and technological challenges related to exploitation of oil and gas in the European Arctic.</b></p> <ul style="list-style-type: none"> <li>• localization of oil and gas resources</li> <li>• climate conditions</li> <li>• ice and permafrost on land</li> <li>• off-shore conditions</li> <li>• technology in exploration and exploitation</li> <li>• environmental challenges</li> </ul> <p><i>Lecturer: Per Johan Brandvik, UNIS</i></p>
<p><b>Petroleum Resources of the Arctic</b></p>

<b>Title and content</b>
<ul style="list-style-type: none"> <li>• Arctic overview</li> <li>• Resource assessments</li> </ul> <p><b>Lecturer : Harald Brekke NPD</b></p>
<p><b>Petroleum resource management</b></p> <ul style="list-style-type: none"> <li>• Norwegian management system</li> <li>• Arctic exploration and production</li> <li>• Transport of petroleum in the Arctic</li> </ul> <p><b>Lecturer : Harald Brekke NPD</b></p>
<p><b>International relations in the Arctic</b></p> <ul style="list-style-type: none"> <li>• Geoscientific research and mapping cooperation</li> <li>• Boundaries in the Arctic</li> <li>• International political bodies and issues</li> </ul> <p><b>Lecturer : Harald Brekke NPD</b></p>
<p><b>Environmental Impact Assessment and Risk Analysis in Arctic regions</b></p> <ul style="list-style-type: none"> <li>• General themes and principles of EIA.</li> </ul> <p><b>Lecturer: Gunnar Sander, NP</b></p>
<p><b>Environmental Impact Assessment and Risk Analysis in Arctic regions</b></p> <ul style="list-style-type: none"> <li>• General themes and principles of EIA.</li> </ul> <p><b>Lecturer: Gunnar Sander, NP</b></p>
<p><b>Environmental Impact Assessment and Risk Analysis in Arctic regions</b></p> <ul style="list-style-type: none"> <li>• EIA as applied to Arctic regions.</li> </ul> <p><b>Lecturer: Gunnar Sander, NP</b></p>
<p><b>Environmental Impact Assessment and Risk Analysis in Arctic regions</b></p> <ul style="list-style-type: none"> <li>• Case studies: Svea mine and Barents Sea protection plan.</li> </ul> <p><b>Lecturer: Gunnar Sander, NP</b></p>
<p><b>Science and politics in international environmental regimes</b></p> <ul style="list-style-type: none"> <li>• emergence of key issues</li> <li>• science, - legitimating or influencing policy (-makers)?</li> <li>• from knowledge to policy, -who are the operators</li> <li>• international nature conservation initiatives, - business or environmental concern?</li> <li>• media and NGOs, - a rational alliance?</li> <li>• achievements in international nature conservation</li> </ul> <p><b>Lecturer: Steinar Andresen, UiO</b></p>
<p><b>Marine mammal resources in the North Atlantic, -political and economic perspectives on management and utilization.</b></p> <ul style="list-style-type: none"> <li>• incentives and interests in marine mammal utilization</li> <li>• national interests and international attitudes</li> </ul> <p><b>Lecturer: Steinar Andresen, UiO</b></p>
<p><b>Marine mammal resources in the North Atlantic, -political and economic perspectives on management and utilization.</b></p> <ul style="list-style-type: none"> <li>• international initiatives and management regimes</li> <li>• management systems- implementation and compliance</li> <li>• development of conservation ideas and measures for sustainable resource utilization</li> </ul> <p><b>Lecturer: Steinar Andresen, UiO</b></p>
<p><b>Subsistence cultures in the Arctic, -past and present</b></p> <ul style="list-style-type: none"> <li>• ethnic groups and their distribution</li> </ul>

Title and content
<ul style="list-style-type: none"> <li>• resource base for groups and societies</li> <li>• interactions between humans and ecosystems and populations</li> <li>• social and cultural characteristics</li> <li>• future perspectives ethnic groups in the Arctic</li> </ul> <p><b>Lecturer: : Lars Walløe, UiO</b></p>
<p><b><i>NAMMCO,-a management regime for marine mammals in the North Atlantic</i></b></p> <ul style="list-style-type: none"> <li>• about the North Atlantic Marine Mammal Commission (NAMMCO)</li> <li>• authority and jurisdiction</li> <li>• objectives and work procedures</li> <li>• scientific initiatives and priorities</li> <li>• advisory and managerial role</li> </ul> <p><b>Lecturer: : Lars Walløe, UiO</b></p>
<p><b>Whaling in the North Atlantic, - principles, procedures and relationships to sustainable management.</b></p> <ul style="list-style-type: none"> <li>• a summary of the whaling history</li> <li>• IWC and the development of management regimes</li> <li>• the whaling moratorium</li> </ul> <p><b>Lecturer: : Lars Walløe, UiO</b></p>
<p><b>Whaling in the North Atlantic, - principles, procedures and relationships to sustainable management.</b></p> <ul style="list-style-type: none"> <li>• development of minke whale populations</li> <li>• populations census and monitoring</li> <li>• models for harvest regimes</li> </ul> <p><b>Lecturer: : Lars Walløe, UiO</b></p>
<p><b>Whaling in the North Atlantic, - principles, procedures and relationships to sustainable management.</b></p> <ul style="list-style-type: none"> <li>• sustainable management and utilization</li> </ul> <p><b>Lecturer: : Lars Walløe, UiO</b></p>
<p><b>The AB-203 course – round up and exam preparation</b>  <b>Steve Coulson, UNIS.</b></p>