THE UNIVERSITY of EDINBURGH
School of GeoSciences

Pre-arrival reading lists

This document contains pre-arrival reading lists for Postgraduate Taught Programmes where they have been provided by Programme Directors.

Contents

Useful preparation for students on all programmes

Many of the programmes' assessments require a high level of writing and critical analysis, so you want to make sure your critical analysis and essay writing skills are at a Master's level. The University's Institute for Academic Development has some useful exercises and learning resources:

- **Academic writing**: https://www.ed.ac.uk/institute-academic-development/study-hub/learning-resources/writing
- **Critical thinking**: https://www.ed.ac.uk/institute-academic-development/study-hub/learning-resources/critical

All students would benefit from practicing engaging with the academic literature (i.e., academic articles published in peer-reviewed journals). Locating, reading, and taking notes from these papers efficiently are key skills. Practicing these skills are especially important for students for whom English is a second language and who may never have attempted to read peer-reviewed articles in English before. Students are recommended to do the following:

- Read the following article and the comments on how academics read scientific articles: https://www.sciencemag.org/careers/2016/03/how-seriously-read-scientific-paper
- Read about different note-taking systems that exist (and the software that exists to support them). Examples include Cornell notes, outlining, concept mapping, and creating synthesis sheets.
- Read about the academic databases that curate journal articles (i.e. Web of Science and Scopus) and how to use them
- For papers that pique your interest, practice reading and taking notes from them, testing different strategies so that you can work out an efficient system before you arrive

All students would benefit from learning about various tools that will help them develop an effective electronic workflow while they are here. That means using online resources (including YouTube videos and stack overflow), and selecting either:

- An electronic reference manager (e.g. EndNote, Zotero, Mendeley)
- An electronic note-taking platform (e.g. EverNote, OneNote, Good Notes, etc.)

MSc Carbon Management

A suggested text reading list

- The Synthesis Report of the IPCC Sixth Assessment Report (AR6), and the detailed WG reports, provide a good overview of the state of knowledge concerning the science of climate change: https://www.ipcc.ch/assessment-report/ar6/
- Nature Climate Change (Journal) Nature Climate Change
- The Great Derangement: Climate Change and the Unthinkable, by Amitav Ghosh (University of Chicago Press)

Some other good resources to familiarise yourself with:

- Carbon Brief: https://www.carbonbrief.org/
- Bloomberg Green: https://www.bloomberg.com/green
- Ask NASA Climate: https://climate.nasa.gov/blog/
- Copernicus (Climate Change Service) https://climate.copernicus.eu/

Some inspiring podcasts and Twitter feeds:

- BBC Sounds, The Climate Question, The Big Green Money Show and other podcasts
- The Beam Magazine: https://twitter.com/TheBeamMagazine
- UN Climate Change: https://twitter.com/UNFCCC

The programme assessments require a high level of writing and critical analysis, so you want to make sure your critical analysis and essay writing skills are at a Master's level. The University's Institute for Academic Development has some useful exercises and learning resources:

- **Academic writing**: https://www.ed.ac.uk/institute-academic-development/study-hub/learning-resources/writing
- **Critical thinking**: https://www.ed.ac.uk/institute-academic-development/study-hub/learning-resources/critical

MSc Carbon Management Online

The IPCC sections are a great place to start. The synthesis documents in particular would be very useful to read before starting (e.g., https://www.ipcc.ch/report/sixth-assessment-report-cycle/).

Also, if you haven't written an essay in a few years, there are several online guides on academic writing (and some great textbooks).

Some other good resources to familiarise yourself with:

- Carbon Brief: https://www.carbonbrief.org/

MSc Earth Observation and Geoinformation Management and MSc Geographical Information Science

Whilst we don't assume extensive experience with GIS OR with computer programming, students who have familiarised themselves with the resources below may find the transition onto the programme easier.

There are lots of great online resources which you might find helpful for learning the basics of ArcGIS, QGIS, Python, R and SQL. Below are a few links to online coding and GIS courses which may be useful:

DataCamp
The course focuses on Python specifically for data science. Lessons are interactive. A combination of videos and exercises and takes around 4 hours to complete. Covers: Basics, List, Packages, Functions and NumPy. Also covers introductions to R and SQL which could be useful. Link: https://www.datacamp.com

CodeAcademy
Fundamental programming concepts and the Python programming language course. Lessons are interactive. Time to complete is estimated at 25 Hours and there are no prerequisites. The syllabus is extensive and covers: Python Syntax, Strings and Console Output, Conditionals and Control Flow, Functions, Lists & Dictionaries, Lists and Functions, Loops, Advanced Topics in Python, Introduction to Classes, File Input and Output.
Link: https://www.codecademy.com/learn/learn-python

Quantum GIS https://qgis.org/en/site/forusers/trainingmaterial/index.html
This freeware GIS is now well developed, and there are a good set of related resources, including tutorials at sites such as the one below. You can download the actual GIS software, and practice with the data sets provided. These resources cover basic GIS principles, all the way up to advanced topics including using python programming with GIS, conducting network analysis and more advanced spatial analysis, plus introductory web mapping. **http://www.qgistutorials.com/en/**

ESRI Virtual Campus https://www.esri.com/training/
This commercial site provides training resources for using ArcGIS and its extensions. Some of the courses are available free of charge.

Suggested Pre-arrival READING

- Schmandt, M. GIS Commons: An introductory textbook on Geographic Information Systems *free web enabled resource: http://giscommons.org/*
- de Smith, M Goodchild M F Longley P A 2015 Geospatial Analysis A Comprehensive Guide to Principles Techniques and Software tools. Third edition *free web enabled resource: http://www.spatialanalysisonline.com/index.html*
- Longley P A, Goodchild M F, Maguire D J and Rhind D W (eds) (2010) Geographical *Information Systems and Science*. Chichester: Wiley. 3rd Edition.

Periodicals to browse:

- JOSIS, https://josis.org/index.php/josis
- International Journal of Geographical Information Science, https://www.tandfonline.com/journals/tgis20
- Computers, Environment and Urban Systems (CEUS), www.journals.elsevier.com/computers-environment-and-urban-systems
- Transactions in GIS, https://onlinelibrary.wiley.com/journal/14679671
- Cartography and GIS http://www.cartogis.org/

MSc Ecological Economics

A suggested text reading list

As a part of getting ready to study Ecological Economics, students are encouraged to engage in some preparatory reading. The following is a list of recommendations that previous students have found to be helpful. The Programme Directors can be contacted for more tailored recommendations:

- *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist* by Kate Raworth
- *Thinking in Systems: A Primer* by Donella Meadows
- *Designs for the Pluriverse: Radical Independence, Autonomy, and the Making of Worlds* by Arturo Escobar
- *The Future is Degrowth: A Guide to a World Beyond Capitalism* by Matthias Schmelzer, Andrea Vetter, and Aaron Vansintjan

Students have additionally found resources focused on providing introductions to postgrowth, ecology and environmental systems, statistical inference, qualitative methods, and the use of the R-programme language to be helpful. We suggest that students consider the areas where they have the least experience and undertake some introductory self-study work prior to matriculating to better enable them to engage in the interdisciplinary dimensions of Ecological Economics.

If students are inexperienced in writing analytical essays in English using evidence found in literature, they should seek preparation specifically related to this. This kind of writing constitutes a significant part of the assessment in the programme, including in the dissertation. Students who have little practice in consciously engaging in critical thinking, critical reflection, and synthesis are recommended to engage with these topics prior to matriculating.

All students would benefit from practicing engaging with the academic literature (i.e. academic articles published in peer-reviewed journals). Locating, reading, and taking notes from these papers efficiently are skills that few students have practiced prior to joining the MSc programme. Practicing these skills are especially important for students for whom

English is a second language and who may never have attempted to read peer-reviewed articles in English before. Students are recommended to do the following:

1. Read the following article and the comments on how academics read scientific articles: https://www.sciencemag.org/careers/2016/03/how-seriously-read-scientific-paper
2. Read about different note-taking systems that exist (and the software that exists to support them). Examples include Cornell notes, outlining, concept mapping, and creating synthesis sheets.
3. Read about the academic databases that curate journal articles (i.e. Web of Science and Scopus) and how to use them
4. Practice searching in one of those databases for papers published in the journal *Ecological Economics* on topics that interest you.
5. For papers that pique your interest, practice reading and taking notes from them, testing different strategies so that you can work out an efficient system before you arrive

All students would benefit from learning about various tools that will help them develop an effective electronic workflow while they are here. That means using online resources (including YouTube videos and stack overflow), and selecting
1) an electronic reference manager (e.g. EndNote, Zotero, Mendeley)
2) an electronic note-taking platform (e.g. EverNote, OneNote, Good Notes, etc.)

If students have never used Excel before, they should teach themselves the basics independently, and practice troubleshooting online (using Excel help files, online tutorials, websites like stack overflow and stack exchange).

MSc Energy, Society and Sustainability

Recommended Texts

- Stirling, A. (2014) 'Transforming power: Social science and the politics of energy choices', *Energy Research & Social Science* 1: 83-95.
- Meadowcroft, J. (2009) 'What about the politics? Sustainable development, transition management, and long term energy transitions', *Policy Sciences* 42: 323.
- Watts, L (2019) Energy at the End of the World: An Orkney Islands Saga. Infrastructures. Cambridge MA/London: MIT Press.

Kirsten Jenkins (Programme Co-Director) Key Contributions

- Jenkins, K.E.H., McCauley, D., Heffron, R., Stephan, H. and Rehner, R. (2016) 'Energy justice: A conceptual review', *Energy Research & Social Science* 11: 174-182.
- Kohler, J., Geels, F., Kern, F., Markard, J., Wieczorek, A., Alkemade, F., Avelion, F., Bergek, A., Boons, F., Funfschilling, L., Hess, D., Holtz, G., Hyysalo, S., Jenkins, K.E.H., Kivimaa, P., Martiskainen, M., McMeekin, A., Muhlemeier, M.S., Nykvist, B., Onsongo, E., Pel, B., Raven, R., Rohracher, H., Sanden, B., Schot, J., Sovacool, B., Turnheim, B., Welch, D., Wells, P. 2019. An agenda for sustainability transitions research: State of the art and future directions.
- Environmental Innovation and Societal Transitions, *Environmental Innovation and Societal Transitions* 31: 1-32.
- Jenkins, K.E.H., Sovacool, B.K. and McCauley, D. (2018) 'Humanizing sociotechnical transitions through energy justice: An ethical framework for global transformative change', *Energy Policy* 117: 66-74.
- Jenkins, K.E.H. (2018) 'Setting energy justice apart from the crowd: lessons from environmental and climate justice', *Energy Research & Social Science* 29: 117-121.

MSc Environment and Development

Books:

- Nightingale A. (ed.) (2019) Environment and Sustainability in a Globalizing World. Routledge. https://www.taylorfrancis.com/books/e/9781315714714
- Brooks A. (2017) The End of Development. A Global History of Poverty and Prosperity. Zed Books. https://www.bloomsbury.com/uk/search/?q=The%20End%20of%20Development.%20A%20Global%20History%20of%20Poverty%20and%20Prosperity.%20
- Robbins, P. (2004/2012) *Political Ecology: A Critical Introduction*. Blackwell: Oxford.
- Potter et al. (2018) *Geographies of Development*. Routledge.

Blogs and other online resources:

- https://survivalinternational.org/campaigns/biggreenlie

- https://justconservation.org/
- https://politicalecologynetwork.org/
- https://ejatlas.org/
- https://www.iied.org/blogs
- https://www2.helsinki.fi/en/conferences/exalt-2021
- https://www.ft.com/content/10d8f5e8-74eb-11ea-95fe-fcd274e920ca Arundhati Roy: 'The pandemic is a portal'

MSc Environmental Protection and Management

Whilst there is no required reading before starting this MSc programme, those from a non-environmental/science background may find it particularly useful to prepare by reading about the basics of applying science to environmental issues, and in reading about key environmental issues. Note that the links below can provide you with a LOT of reading, so please do not drown in information!

Environmental science

Almost any basic textbook will cover the key environmental issues. Importantly, make sure that you also read about the scientific method/approach if you are from a non-scientific background. Examples of possible texts to read include Living in the Environment (G. Tyler Miller); Environmental Science: Earth as a Living Planet (D.B. Botkin & E.A. Miller); Environmental Science. A Global Concern (W.P. Cunningham & B.W. Saigo); Environmental Science for Dummies (A.M. Spooner). There are many other suitable general environmental science books also available, ideally make sure that that they cover the range of issues you want to become familiar with (e.g. physical environment, biological environment, human issues and impacts, policy and economics, etc).

Environmental organisations and issues.

There are many environmental organisations (private and governmental) that can provide excellent background to whatever range of issues you wish to cover. Those listed here are just a selection, with a bias towards the Scotland/UK/EU (as that is where you will be studying), but we'd encourage you to engage with similar organisations in your home country or area of the world you plan to work in. Some of these organisations will provide the option of getting email / twitter updates, and these can be useful in getting up to date information on a regular basis. They will also be useful for background reading during your time with us.

- Climate change - http://www.ipcc.ch/
- Millennium Ecosystem Assessment (bit dated, still worth looking at) - http://www.millenniumassessment.org/en/index.html
- Global Biodiversity Outlook - https://www.cbd.int/gbo4/
- Global Environment Outlook - http://www.unep.org/geo/
- United Nations Environment Programme - http://www.unep.org/

- EU Environment - http://ec.europa.eu/environment/index_en.htm

At the more local level, if you want to become familiar with issues facing Scotland, it is worth looking at these organisations/sources too.

- Scotland's Environment - https://www.environment.gov.scot/
- SEPA - http://www.sepa.org.uk/
- NatureScot – http://www.nature.scot/

Professional bodies

You may find it useful to become student members of one or more professional organisations. Membership may provide you with access to relevant online research and practical materials, access to training courses, job opportunities, and professional contacts. When you join the MSc here, we will automatically pay for your membership of the Institute of Environmental Sciences (https://www.the-ies.org/). However, you may like to also consider membership of the following (depending on your interests, so read through what subjects/fields each organisation covers).

- CIEEM (http://www.cieem.net/). Student membership costs £29.
- IEMA (http://www.iema.net/). Student membership costs £30, graduate membership (dependant on your first degree) costs £151.
- BES (http://www.britishecologicalsociety.org/). Student membership costs £25 or may be free for 12 months for students studying an ecology or ecology-related degree.
- There may also be other professional bodies relevant to you (particularly in your own country), so make sure you do your own research into what organisations may be useful to you.

Please do not drown in too much information, so read selectively. If you would like more guided reading on any particular topic, please don't hesitate to contact your programme director, Alistair Hamilton (Alistair.hamilton@sruc.ac.uk).

MSc Environmental Sustainability

Books:

- John Blewitt's (2019) *Understanding Sustainable Development*
- Sharon Beder (2006) *Environmental Principles and Policy*
- Robert Kimmerer (2020) *Braiding sweetgrass. Penguin Books, London*
- David Spiegelhalter (2020) *The Art of Statistics: Learning from Data*

Please familiarise yourselves with the courses offered by the Institute for Academic Development. Many students ignore reminders that writing courses are available – such courses are very helpful and will improve coursework structure and style.

MSc Food Security

- In Brief to The State of Food Security and Nutrition in the World 2022: https://www.fao.org/documents/card/en/c/cc0639en

- Global Food Security: What Matters? By Zhang-Yue Zhou. ISBN 9781138222793.

MSc GeoEnergy

If you cannot access the papers, please contact Stuart Gilfillan (stuart.gilfillan@ed.ac.uk) who will be able to send you copies. If you have special interest in a different topic, let Stuart know and he will ask the person who teaches it if they have a recommendation.

Books:

- Introduction to Carbon Capture and Sequestration, Smit et al, The Berkley Lectures on Energy Vol 1., Imperial College Press, the best textbook on CCS.
- Returning Carbon to Nature: Coal, Carbon Capture, and Storage by Michael Stephenson.
- Challenged by Carbon, the oil industry and climate change. By Bryan Lovell.
- Sustainable Fossil Fuels, Mark Jaccard.

Journals:

- Keeping warm: a review of deep geothermal potential of the UK JG Gluyas and others, Proceedings of the Institution of Mechanical Engineers, Part A: Journal of Power and Energy, https://doi.org/10.1177/0957650917749693
- Julien Mouli-Castillo, Mark Wilkinson, Dimitri Mignard, Christopher McDermott, R. Stuart Haszeldine and Zoe K. Shipton: Inter-seasonal compressed-air energy storage using saline aquifers, Nature Energy, 4, 131–139. 2019
- AMID, A., MIGNARD, D., and WILKINSON M. Seasonal storage of hydrogen in a depleted natural gas reservoir. International Journal of Hydrogen Energy, 41, 5549–5558. 2016
- Deep-Mined Geological Disposal of Radioactive Waste, ELEMENTS vol 12 no. 4, 2016. https://www.ed.ac.uk/sites/default/files/atoms/files/elements_-_radioactive_waste_disposal.pdf (a whole issue of papers written for a non-expert audience, an excellent broad intro)
- Microbes – Oilfield Enemies or Allies (i.e. life in the subsurface), Oilfield Review 2012, vol 24 no. 2, https://www.ed.ac.uk/sites/default/files/atoms/files/oilfield_review_-_summer_2012.pdf
- The deep, hot biosphere: Twenty-five years of retrospection by Daniel R. Colman and others. Proc Nat. Academy Sci of the USA, v. https://www.pnas.org/content/114/27/6895

Reports:

- IPCC Report on Climate Change

MSc Marine Systems and Policies

We are facing a global biodiversity and climate crisis, and our Programme students are trained to think and work across disciplines to help unlock solutions. Critical reading and understanding about these challenges can be found in:

1. Chapter 5, "Changing Ocean, Marine Ecosystems, and Dependent Communities" in the Intergovernmental Panel on Climate Change (IPCC)'s Special Report on the Ocean and Cryosphere in a Changing Climate:

https://www.ipcc.ch/site/assets/uploads/sites/3/2022/03/07_SROCC_Ch05_FINAL.pdf

2. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Global Assessment Report on Biodiversity and Ecosystem Services

https://www.ipbes.net/global-assessment

We urge new students to read both documents, and come prepared and inspired to find their path in helping the world unlock these solutions.

Keep abreast of current climate change and environmental news. There are several great websites and twitter feeds (CarbonBrief is a favourite).

MSc Soils and Sustainability

The programme covers a diverse range of topics and so specific reading materials are suggested by lecturers weekly to provide you with the most up to date and relevant sources of information. Lecturers are mindful that students on this programme have varied backgrounds and so you will be guided through the programme material and have access to online and library resources.

Books:

- Weil, R.R., & Brady, N.C. (2016) The nature and properties of soils The Nature and Properties of Soils : Ray R. Weil, : 9781292162232 : Blackwell's
- N. Eash et al (2016) Soil science simplified. Soil Science Simplified: Neal Samuel Eash (author): 9781118540695: Blackwell's

Online resources:

- FAO Soils Portal http://www.fao.org/soils-portal/about/en/

- The EU Soil Observatory: https://joint-research-centre.ec.europa.eu/eu-soil-observatory-euso_en
- British Soil Science Society: https://www.soils.org.uk/
- http://www.fao.org/3/i3794en/I3794en.pdf
- Valuing Your Soils - Farming and Water Scotland
- GREATsoils | AHDB