

**Natural Resources Institute**  
**Clayton H. Riddell Faculty of Environment, Earth, and Resources**  
**University of Manitoba**

**This document is available in alternate formats upon request**

**ENVR 4000: Energy Resources Management and Policy (Energy Transitions: Sustainability, Climate Change, and Policy) (3 credit hours)**

Winter 2026

Thursday 1:30 pm – 4:30 pm

320 Sinnott Bldg.

Instructor: Dan Barchyn

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Office Hours: Thursdays 10:00 am – 1:00 pm or by appointment

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**Course Description**

Globally, energy resources have been essential drivers of economic development and advances of modern civilization. With fossil fuels now dominating the current energy mix, it is becoming clear that our current energy use is not sustainable and that a rapid decarbonization of our energy systems is required to avoid potentially catastrophic climate change. This course will examine energy basics and historical energy transitions leading to our current situation. Transition scenarios to achieve decarbonization will be examined with emphasis on the required policy packages and consideration of the socio-political dimensions. Examples of national energy policies will be discussed in the context of climate stringency and differentiated responsibility among developed and developing countries.

**Course Objectives**

The main objective of the course is to enable students to become familiar with the evolution, complexity, and current state of global energy systems and develop an understanding of the challenges, both technical and socio-political, of transitioning to net zero carbon as envisioned by current climate goals. Students will also learn to evaluate and critically analyse specific national energy and climate policy packages.

**Course Textbook**

Winfield, Hill, and Gaede (ed.) 2023: SUSTAINABLE ENERGY TRANSITIONS IN CANADA, UBC Press  
<https://www.ubcpres.ca/sustainable-energy-transitions-in-canada-0a>

Although the course will take a global perspective, specific issues in the Canadian context drawing on material from the text will be examined. Students will not be required to purchase this text as it is open-access and can be downloaded.

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## **Weekly Readings**

Readings will be assigned on a weekly basis. These readings will form the basis for discussion in the weekly seminars. These readings will comprise of chapters from the textbook, reports from research institutions, academic papers, and other background material for specific issues and case studies to be discussed. Podcasts and video material may also be included. Every effort will be made to ensure that students can access materials through UMLearn.

## **Student Evaluation**

### **Mid-Term Exam 25%**

Students will be required to complete a take-home exam on material covered in the first six weeks. The exam will be assigned on February 12 and be due on February 26.

### **Case Study Report and Presentation 40%**

Students will explore the relationship between political economy and policy by researching some form of energy and climate policy from countries with varying economic development status, domestic energy needs and resources, and economic underpinnings. Consideration of differentiated responsibility among nations based on development status will be incorporated as well as an evaluation of track records on GHG emission reductions vis a vis historical pledges. The instructor will provide a list of countries to choose from. Both a written report and oral presentation to class will be required. Students should be prepared for their presentations and submit their written report no later than April 2. The written report should be no longer than ten pages, double spaced, 12 point font. Further details and instructions will be provided.

### **Final Reflective Essay 25%**

Students will submit an essay summarizing their personal reflections on the current state of global efforts to de-carbonize and their opinions on the future trajectory of the transition to cleaner energy systems. This essay should draw upon the materials covered in the course and ideally cover both the technological and socio-political dimensions of the transition. The essay should be no longer than six pages, double spaced, 12 point font and will be due April 16. Further details and instructions will be provided.

### **Class participation 10%**

Attendance and participation in discussion is a vital component that will be assessed during the course. Participation will be evaluated based on the extent and, more importantly, the quality of contributions (questions and comments, etc.) to discussions in the weekly classes.

Percent to grade conversions:

90-100% = A+

85-89% = A

80-84% = B+

75-79% = B

70-74 = C+

65-69% = C (fail)

## **Course Content**

Weekly seminars will consist of both lecture and discussion time. Case studies relevant to the specific topics will be examined. Guest speakers on relevant topics will be invited. Students will be expected to have completed the required readings for each seminar in advance and be prepared to participate in discussions of the readings content and engage in discussion with guest speakers. The success of the course will depend, to a large degree, on the input of all participants in the discussions. The following Seminar Schedule gives a general description of the topics to be covered. This Schedule and topics listed are subject to change. A readings list including case studies and guest speakers will be provided in advance of Week 1 and updated on an on-going basis on the course site on UM Learn.

## **Seminar Schedule Outline: Generalized Topics and Questions to be Addressed**

Week 1: Jan. 8	<b>Introduction Energy Basics</b>	What is the current state of climate politics? What is energy and what are energy conversions? How is energy and energy use measured?
Week 2: Jan. 15	<b>Energy Basics</b>	What is the relationship between energy consumption and economic development? How has energy consumption changed over time and what are the technical and economic dimensions of these historical transitions? What is the current global energy mix?
Week 3: Jan. 22	<b>Energy Sustainability</b>	What are the environmental dimensions of current energy systems? What are the GHG impacts of current energy use? What does climate modelling tell us about these trends? How substitutable are alternative energy technologies in using energy for power generation, transportation, space heating, and industry?
Week 4: Jan. 29	<b>Energy and Climate Policy</b>	What are and how effective are various policy tools?

		How has the global energy mix responded to climate related policy in terms of efficiency and technology? How have GHG trends responded?
Week 5: Feb. 5	<b>Integrated Assessment Models</b>	What are integrated assessment models and what is their role in climate policy development? What are the most widely used global models?
Week 6: Feb. 12	<b>Energy Transition Pathways</b>	Why 1.5 degrees as a target? Is it still a realistic goal? What is net-zero? What are the important components to be considered in assessing transition pathways? What are the roles of technology, efficiency, finance, permitting ease, and availability of critical minerals and components?
Week 7: Feb. 26	<b>Energy Transitions Pathways: Policy Gaps</b>	What are the gaps between stated policies and policies assumed in net-zero scenarios? How urgent is the need for policy enhancement?
Week 8: Mar. 5	<b>Energy Transition Pathways: Policy Barriers</b>	What are the socio-political dimensions of energy and climate policy? What are the factors creating tension between urgency and maintaining current environmental regulatory standards?
Week 9: Mar. 12	<b>Energy Transition Pathways: Policy Barriers</b>	What is the role of political economy in determining climate policy?
Week 10: Mar. 19	<b>Just Transitions and Differentiated Responsibility</b>	What is a just transition? What is differentiated responsibility in terms of an equitable global policy response? In a global context, which countries are leaders? And Laggards?
Week 11: Mar. 26	<b>Climate Politics</b>	What are the trends in political support for climate action? How does this vary globally? What is “overshoot”? What about “geoengineering”?

Weeks 12 and 13 : Apr. 2 and 9	<b>Case Studies*</b>	Student-led research on national climate policies
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\* Students will explore the relationship between political economy and policy by examining policy from countries with varying economic development status, domestic energy needs and resources, and economic underpinnings. Consideration of differentiated responsibility among nations based on development status will be incorporated as well as an evaluation of track records on GHG emission reductions vis a vis historical commitments.

## **General Information**

### **PLAGIARISM AND CHEATING**

There will be no tolerance for plagiarism or cheating in this course. As per Faculty of Graduate Studies (FGS) guidelines, disciplinary action rests with FGS and not the course instructor. For further information, please see discussions of academic dishonesty, plagiarism and cheating, and examination impersonation in the University General Calendar:

[http://umanitoba.ca/faculties/graduate\\_studies/media/AcademicIntegrity\\_200804.pdf](http://umanitoba.ca/faculties/graduate_studies/media/AcademicIntegrity_200804.pdf)

### **LATE SUBMISSION OF ASSIGNMENTS**

Late submissions will have marks deducted at the rate of 10% on the first day, and 3% per day subsequently.

### **FURTHER INFORMATION**

We are happy to accommodate students with disabilities as per University of Manitoba regulations. Students who would like consideration under accessibility regulations should consult with Student Accessibility Services and then meet with the instructor to discuss accommodation.

## **POLICY REGARDING USE OF AI**

For coursework: Students must seek course instructor consent (if not explicitly articulated in the course outline) prior to using Generative AI (G-AI) tools in each case to ensure its use is within the boundaries of academic integrity, privacy, data security, copyright and intellectual property. If an instructor allows the use of G-AI for coursework, any content produced by G-AI must be cited and acknowledged appropriately to ensure transparency in any submitted materials. Failing to follow these guidelines will be considered academic misconduct.

For research: The use of Generative AI is prohibited with respect to writing (thesis proposal, candidacy exam or thesis), however, there may be situations where it can be used for other purposes, but students must have approval from their advisor and committee prior to doing so and provide a transparency statement establishing how G-AI tools were used.

Please review all the information provided in the Attached [Schedule A](#)

## Appendix: ROASS Schedule A

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## UM Policies

As a student at the University of Manitoba you have rights and responsibilities. It is important for you to know what you can expect from the University as a student and to understand what the University expects from you. Become familiar with the University's policies and procedures and regulations specific to your faculty, college or school.

The University of Manitoba (UM) website's [Governing Documents](#) is one important source of information, in particular the Academic and Students sections. The Student Advocacy office can also help you understand policies and procedures; find their information in the UM Learner Supports section below.

## Academic Calendar

The [Academic Calendar](#) is the University's official publication containing course descriptions, program and graduation requirements, as well as UM and faculty/school-specific rules, regulations and policies. In particular, familiarize yourself with the sections *University Policies and Procedures* and *General Academic Regulations*.

## Academic Integrity

In addition to reviewing your instructor's academic integrity policy listed in their syllabus, you are expected to view the *General Academic Regulation* section within the [Academic Calendar](#) (<https://umanitoba.ca/registrar/academic-calendar>) and specifically read the regulation pertaining to Academic Integrity. Ask your instructor for additional information about demonstrating academic integrity in your academic work, and consult the following UM resources for more information and support:

- [Academic Integrity](https://umanitoba.ca/student-supports/academic-supports/academic-integrity) (<https://umanitoba.ca/student-supports/academic-supports/academic-integrity>)
  - [Student Resources](#)
  - [Academic Misconduct and How to Avoid It](#)
- [Student Advocacy Office](#)

## Copyright

All students are required to respect copyright as per Canada's *Copyright Act*. Staff and students play a key role in the University's copyright compliance as we balance user rights for educational purposes with the rights of content creators from around the world. The [Copyright Office](#) provides copyright resources and support for all members of the University of Manitoba community.

## Grade Appeals

If you have questions about your grades, talk to your instructor. There is a process for term work and final grade appeals. Note that you have the right to access your final examination scripts. See the [Registrar's Office](#) for more information including appeal deadline dates and the appeal form.

## Intellectual Property

For information about rights and responsibilities regarding intellectual property view the [Intellectual Property Policy](#)

## Program-Specific Regulations

For information on regulations that are specific to your academic program, read the section in the Academic Calendar and on the respective [faculty/college/school](#) website.

## Respectful Work and Learning Environment

The University is committed to a respectful work and learning environment. You have the right to be treated with respect and you are expected to conduct yourself in an appropriate and respectful manner. Policies governing UM community behaviour include:

- [Respectful Work and Learning Environment](#)
- [Student Discipline](#)
- [Violent or Threatening Behaviour](#)

The UM website, [Engaging in Respectful Conduct](#) includes more details about expectations for behaviours related to university activities.

## Sexual Violence Policies

The UM has several policies and procedures that deal with the rights and responsibilities of the University community with regards to all forms of sexual violence. For a comprehensive list of policies and associated resources, visit the [Sexual Violence Resource Centre's information page](#). Please note that there are many supports available in addition to these policy documents (see UM Learner Supports).

## Voluntary Withdrawal

Voluntary withdrawal (VW) is a way for students to leave a class without academic penalty once the Registration Revision Period has ended. If you opt to voluntarily withdraw from a course, you will not be eligible for a refund and, if applicable, will still be required to pay any outstanding tuition fees for the course. On your transcript, the course you have withdrawn from will be listed; however, "VW" will appear in lieu of a grade. If you do not drop a course before the VW deadline, you will receive a final grade in the course on your transcript.

Please note that there are separate deadlines for dropping a course early in a term during the Registration Revision Period. Dropping a course means you are removing that course from your schedule, will not be charged tuition fees for that course, and the course will not appear on your transcript.

The Registrar's Office website, [Withdraw from a Course](#), includes more information on the different ways in which you can withdraw from a course and important dates and deadlines to do so.

## UM Learner Supports

Below you will find a select list of important supports for learners at the UM, both academic supports and otherwise. For a complete listing of all learner supports at the University of Manitoba, visit the [Everything You Need to Thrive](#) website.

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## 2SLGBTQIA+ Community

Find your queer community on campus! UM is committed to being an inclusive and welcoming space for all 2SLGBTQ+ students, staff and faculty. Visit the [2SLGBTQ+ Community](#) website to access services, find resources, and connect with like-minded people and allies.

## Academic Advising

Contact an [Academic Advisor](#) for support with degree planning and questions about your academic program and regulations.

## Academic Learning Centre (ALC)

The [Academic Learning Centre](#) offers one-to-one tutoring, group study sessions and workshops, as well as video and tip-sheet resources to help you throughout your academic program. All Academic Learning Centre programming, supports, and services are free for UM students. Make an appointment for [free one-to-one tutoring](#). Content tutors (over 90 UM courses) can help you understand concepts and learn problem-solving strategies. Study skills tutors can help you improve your skills such as time management and goal setting, reading and note-taking, as well as learning and test-taking strategies. Writing tutors can give you feedback on your academic writing, whether you are just getting started on a written assignment or already have a draft. English as an Additional Language specialist, Antoanela Denchuk, is available for one-to-one tutoring to help you improve your English-language academic writing skills. Use the drop-down menu, read the tutor biographies, and make an appointment for tutoring on the [Academic Learning Centre schedule](#).

Attend [Supplemental Instruction \(SI\)](#) sessions in historically difficult courses (including Chemistry, Engineering, and Computer Science). These free weekly review sessions are facilitated by a peer mentor who has previously taken the course and provide an opportunity to discuss course content, ask questions, compare notes, solve practice problems, and develop study strategies. See online for a list of SI courses and meeting times.

Register for an [Academic Skills Workshops](#), where you can learn strategies to improve your writing and studying. More information on topics, dates, and registrations, is found online.

Register for [Faculty of Graduate Studies Grad Steps Workshops](#). These workshops are specifically designed for students working towards Master's degrees or PhDs. More information on topics, dates, and registration can be found online.

Access the Academic Learning Centre's collection of [videos and tip sheets](#) to help you with many of the academic tasks you'll encounter in university.

**Contact the Academic Learning Centre** by calling 204-480-1481 or emailing [academic\\_learning@umanitoba.ca](mailto:academic_learning@umanitoba.ca). Bannatyne students can contact the **Bannatyne Student Services** office at 204-272-3190.

## Basic Needs

It can be difficult to learn and succeed in courses when you are struggling to meet your or your family's basic needs. Several UM and community resources are listed below if you would benefit from support with regards to housing, food, finances, and/or childcare:

- *Housing*
  - [UM Housing](#)
  - [Winnipeg Rental Network](#)

- [Manitoba Residential Tenancies Branch](#)
- [HOPE End Homelessness Winnipeg Services & Supports \(https://umanitoba.ca/housing\)](https://umanitoba.ca/housing)
- *Food*
  - [U of M Food Bank](#)
  - [Food Matters Manitoba](#)
- *Finances*
  - [UM Financial Aid and Awards](#)
  - [Manitoba Student Aid](#)
- *Child Care*
  - [UM Child Care](#)
  - [Manitoba Child Care Subsidy](#)
  - [Manitoba Child Care Association](#)

## English Language Centre

The [English Language Centre \(ELC\)](#) provides in-person and remote courses, and individual support to students whose first language is not English to support academic success and participation in the University of Manitoba community.

The ELC helps students meet the English Language Proficiency Requirement for most programs at the University of Manitoba. Over 80 per cent of students who enter the ELC's Intensive Academic English Program successfully complete the program and begin their degree at the University of Manitoba.

## Health and Wellness

Physical, mental, emotional, and spiritual health and wellness play a critical role in student success. See all of UM's resource on their [Health and Wellness](#) website, and make note of several specific UM and community supports listed below.

### Winnipeg Urgent Physical and Mental Health Care

If you are an adult experiencing a mental health or psychosocial crisis, you can:

- contact the [Canada Mental Health Crisis Line](#) at 9-8-8
- or the [Klinic Community Health](#) 24/7 crisis line at 204-786-8686,
- visit the [Crisis Response Centre](#) located at 817 Bannatyne Avenue.

To speak with a nurse for guidance on what health-care path to take for the issue you are facing or for general information about health resources available in Manitoba, contact [Health Links](#) at 1-888-315-9257 (toll free).

If you need urgent medical care, visit the Winnipeg Regional Health Authority's [Emergency Department & Urgent Care Wait Times](#) webpage for a list of locations and current wait times.

### Student Counselling Centre (SCC)

The [Student Counselling Centre](#) provides free counselling and mental health support to UM, English Language Centre, and International College of Manitoba (ICM) students. We are open year-round, Monday through Friday from 8:30 am to 4:30 pm. Our commitment is to offer a support service to every student who contacts us.

Visit the SCC's [For Urgent Help](#) webpage or the urgent care resources listed above if you require immediate support.

Visit the [SCC's Our Services](#) webpage for more information on accessing a variety of services including individual counselling, counselling workshops and groups, support resources, and learning disability assessment services. *The SCC is located at 474 UMSU University Centre (Fort Garry Campus).*

#### Health and Wellness Office

Students often juggle multiple demands, and we recognize that it can be difficult to find balance. For any changes you want to make to your health and wellness, the Health and Wellness Office at the University of Manitoba would like to support you in your journey. We are here to help you take control of your own health and make your own decisions. We are a judgment-free space, and we avoid labels whenever possible. For more information, please visit the [Health and Wellness Office](#) website.

#### Student Wellness Centre (SWC)

The SWC is an inclusive space for students to rest, recharge and learn skills to actively engage in and maintain their wellbeing throughout their time in university. It is a resource hub for a range of wellness-related services including consultations with our professional staff and trained peer educators, events such as pet therapy, workshops, gatherings, and free harm reduction supplies. For more information, please visit the [Student Wellness](#) website. *The SWC is located at 162 Extended Education Building (Fort Garry Campus).*

#### Spiritual Care and Multifaith Centre

Spiritual care services are available to all, whether you identify as spiritual, atheist, religious or agnostic. [Spiritual Services](#) also offer specific denominational support for certain religious groups and by Indigenous Elders-in-Residence.

#### Student Support Case Management (SSCM)

Contact the [Student Support Case Management team](#) is a safe and confidential space, offering students direct support and assistance with getting connected to supports on campus and in the community. We can help with challenges related to mental health, financial or housing insecurity, safety concerns, or any ongoing challenges that are affecting your ability to focus on academics.

Contact the [Student Support Case Management team](#) if you are concerned about yourself or another student and don't know where to turn. SSCM helps connect students with on and off campus resources, provides safety planning, and offers other supports including consultation, educational workshops, and referral to the STATIS threat assessment team.

#### University Health Service (UHS)

The [University Health Service](#) offers a full range of medical services to students, including psychiatric consultation, via two health clinics:

- Fort Garry Campus (204) 474-8411, 100 UMSU University Centre
- Bannatyne Campus (204) 474-8411, P309 – Pathology Building

#### Student Services at Bannatyne Campus

Student Services at Bannatyne Campus (SSBC) offers a full range of mental health supports to students and residents in the Rady Faculty of Health Sciences, along with

other academic and personal supports. Visit the [SSBC website](#) for a list of services available.

## Indigenous Students

Staff, faculty and Elders are well-equipped to ensure your university experience is as beneficial, accessible, and successful as possible. Visit the Indigenous [Student Experience](#) website for more information on the supports and services available.

## International Students

The transition to a new country and a new academic system can be both exciting and overwhelming. The International Centre (IC) is here to help you settle into life at University of Manitoba. Visit the [International Students](#) website for more information.

## Sexual Violence Support and Education

Sexual violence affects people of all ages, sexual orientations, genders, gender identities, abilities and relationship statuses. At the U of M, we are committed to ensuring a respectful work and learning environment for all. We want to build a safe and inclusive campus community where survivors of sexual violence know they can receive the supports they need to succeed, both academically and personally.

The [Sexual Violence Resource Centre](#), located at 537 UMSU University Centre (Fort Garry campus) provides support, resources, information and referral services for any student, faculty or staff member who has been affected by sexual violence.

## Student Accessibility Services (SAS)

The University of Manitoba is committed to providing an accessible academic community. [Student Accessibility Services](#) offers academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g., mental health, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

SAS is located at 520 University Centre (Fort Garry Campus). You contact SAS in person, by phone (204 474 7423) or email ([student\\_accessibility@umanitoba.ca](mailto:student_accessibility@umanitoba.ca))

## Student Advocacy

[Student Advocacy](#) is a safe place for students. We help you navigate university processes and advocate for your rights as a student at UM. If anything in your personal or academic life is affecting your studies, contact our confidential intake assistant by phone (204-474-7423) or email ([stadv@umanitoba.ca](mailto:stadv@umanitoba.ca)).

## University of Manitoba Libraries (UML)

As the primary contact for all research needs, your liaison librarian can play a key role when completing academic papers and assignments. Liaisons can answer questions about managing citations, or locating appropriate resources, and will address any other concerns you have about the research process. Liaisons can be contacted by email or phone, and are also available to meet with you online or in-person. A [complete list of liaison librarians can be found by subject](#)

General library assistance is also available at both the Bannatyne and Fort Garry campuses by [visiting any library location](#). When working online, students can receive help via the Ask Us chat button found on the right-hand side of the [Libraries' homepage](#).

## University of Manitoba Students' Union

As the official representative of all University of Manitoba undergraduate students, the [University of Manitoba Students' Union](#) (UMSU) provides a range of resources, services, events and support services, including the U-PASS, Health and Dental coverage, Legal Aid, and