**INDUSTRIAL ECOLOGY: SUSTAINABLE MATERIALS FALL 2021  
ENBUS 406**

Published Sep 09, 2021

**CLASS SCHEDULE**

| **Section** | **Location** | **Time** | **Instructor(s)** |
| --- | --- | --- | --- |
| **ENBUS 406** 001 | ONLN - Online |  | Steven Young sb.young@uwaterloo.ca |
| **ENBUS 406** 002 |  |
| **ENBUS 406** 101 |  |
| **ENBUS 406** 102 | EV3 3412 | Tuesdays  10:30 a.m. - 11:20 a.m. |
| This table is generated automatically | | | |

**INSTRUCTOR / TA INFORMATION**

Prof. Steven B. Young

School of Environment, Enterprise and Development (SEED), EV3 room 4243

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**COURSE DESCRIPTION**

*ENBUS 406*

Sustainability of industrial materials is examined, including resources, production, use and end-of-life. Different types of industrial materials and major applications (buildings, transportation, communications, etc.) are covered. Industrial ecology and management approaches help restructure production systems and support sustainable development.

Prereq: ENBUS 204; Level at least 4A Environment and Business students

**LEARNING OUTCOMES**

**By the end of this course students should be able to:**

|  |
| --- |
| Describe societal need for raw materials, their production and environmental impacts |
| Use analytical approaches for manage environmental impacts of materials and products |
| Apply systems thinking and life-cycle approach to minerals, materials and products |
| Characterize the dilemma, and possible solutions to, increased use of materials needed for sustainable development |
| Use basic thermodynamics, mass/energy balance and mineral economics |
| Demonstrate skills for estimation, scale, rounding, significant figures, and units of measure |

**TENTATIVE COURSE SCHEDULE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Tutorial on Tuesday** | **Content** | **Assessment** |
| 1 |  | Course introduction, IPAT |  |
| 2 | 14-Sep-20 | Mining and sustainable development |  |
| 3 | 21-Sep-20 | Material history, categories, properties | A1 due Sep 23 |
| 4 | 28-Sep-20 | Material use 1 |  |
| 5 | 05-Oct-20 | Material use 2 | A2 due Oct 7 |
| - | 12-Oct-20 | *Thanksgiving break* |  |
| 6 | 19-Oct-20 | The dilemma |  |
| 7 | 26-Oct-20 | Supply chain risk and critical materials | Test T1 - Oct 28 |
| 8 | 02-Nov-20 | Indicators: Energy, GHG, water |  |
| 9 | 09-Nov-20 | Systems thinking, life cycle approach | A3 due Nov 11 |
| 10 | 16-Nov-20 | Technofixes | P1 due Nov 18 |
| 11 | 23-Nov-20 | Circular economy solutions |  |
| 12 | 30-Nov-20 | Management solutions |  |
|  | 07-Dec-20 | *Tuesday Dec 7 is last tutorial* | P2 due Dec 8 |
|  |  | The exam will be schedule by the Registrar | Final exam |

**WEEKLY SCHEDULE**

**Content**opens on Wednesday each week, asynchronously online in LEARN under Content. This may include narrated PowerPoints, YouTube or other audio-video content, and web pages. Readings are referenced for you to access from LEARN or from the library.

**Tutorials**in-person are Tuesday mornings 10:30 to 11:20 am in EV3 1408. Material for the asynchronous online tutorial will be posted in LEARN under Content after the in-person session.

**Assignments** are due on Thursdays at 11:59 p.m. See below regarding the "No-Excuses-Needed Extension Policy” on assignments.

The **tests** will run on a Thursday. You will have a 24-hour window to answer questions.

The **final exam** will be scheduled by the Registrar at the end of term.

**TEXTS / MATERIALS**

| **Title / Name** | **Notes / Comments** | **Required** |
| --- | --- | --- |
| Ashby, M. F. (2013). Materials and the Environment. Elsevier. <https://doi.org/10.1016/C2010-0-66554-0> | Select chapters | Yes |
| Ashby, M. F. (2016). Materials and Sustainable Development. Elsevier. <https://doi.org/10.1016/C2014-0-01670-X> | Select chapters | Yes |

Textbooks are available in digital form on Library Reserves.

**STUDENT ASSESSMENT**

| **Component** | **Value** |
| --- | --- |
| Assignments (A1-A3): Calculations, interpretation and graphing skills. Lowest graded assignment will be excluded from the gradebook. | 20% |
| Test (T1): To assess knowledge, concepts, terms and understanding. | 20% |
| Project (P1): Project part 1, scoping a topic and identifying references. | 5% |
| Project (P2): Project part 2, final report on a topic of sustainable materials. | 20% |
| Final exam: Scheduled by Registrar | 35% |

**LEARN**is used as the course website. Content for the week will be published on Wednesday.

* Announcements will be made on LEARN
* Due dates will be posted on LEARN, although submissions may be to Crowdmark

**Piazza**is used as a discussion tool and Q&A forum. Post your questions to Piazza (anonymously if you wish). The tool aims to get you help fast and efficiently from classmates, TAs, and the professor.

**Email**should be used for private correspondence to the Professor; otherwise use Piazza. Email subject must identify the course number—or just use the email utility in LEARN.

**Kahoot**may be used for tutorials.

**Crowdmark**is used for submission and grading. Crowdmark provides secure online submissions, and allows detailed marking and feedback, and will provide quick return of assignments. In each case, you will receive an email with a private link to the Crowdmark website asking you to submit your assignment. Crowdmark is designed for page-at-a-time grading: you upload your answers in PDF or another format, drag each answer page to the corresponding question, then submit. UWaterloo supports this software at <https://uwaterloo.ca/crowdmark/>

Akindi or Crowdmark will be used for the test and final exam.

**Microsoft Teams** or **Zoom**will be used for remote office hours or online meetings -- you are encouraged to go to in-person office hours.

**ASSIGNMENT SCREENING**

Text matching software (Turnitin) will be used to screen assessments submitted via the LEARN dropbox. This is being done to verify that use of all material and sources in assignments is documented. In the first week of the term, details will be provided about the arrangements for the use of Turnitin and alternatives in this course. See Administrative Policy below for more information and links.

**NOTICE OF RECORDING**

*Relevant to in-person tutorials.*

Activities for this course involve recording, in partial fulfillment of the course learning outcomes.  You will receive notification of recording via at least one of the following mechanisms: within the Learning Management System (LEARN), a message from your course instructor, course syllabus/website, or other means. Some technologies may also provide a recording indicator. Images, audio, text/chat messaging that have been recorded may be used and/or made available by the University to instructors and students for the purpose of remote access and equity. Recordings will be managed according to the University records classification scheme, WatClass, and will be securely destroyed when no longer needed by the University. Your personal information is protected in accordance with the Freedom of Information and Protection of Privacy Act, as well as University policies and guidelines and may be subject to disclosure where required by law.

The University will use reasonable means to protect the security and confidentiality of the recorded information, but cannot provide a guarantee of such due to factors beyond the University’s control, such as recordings being forwarded, copied, intercepted, circulated, disclosed, or stored without the University’s knowledge or permission or the introduction of malware into computer system which could potentially damage or disrupt the computer, networks, and security settings. The University is not responsible for connectivity/technical difficulties or loss of data associated with your hardware, software or Internet connection.

By engaging in course activities that involve recording, you are consenting to the use of your appearance, image, text/chat messaging, and voice and/or likeness in the manner and under the conditions specified herein. (In the case of a live stream event, if you choose not to have your image or audio recorded, you may disable the audio and video functionality. Instructions to participate using a pseudonym instead of your real name are included where the feature exists; however, you must disclose the pseudonym to your instructor in advance in order to facilitate class participation.) If you choose not to be recorded, this notice serves as confirmation of your understanding that the alternative is meeting directly with the professor, either in person or remoting.

You are not permitted to disclose the link to/URL of an event or an event session recording or copies of recording to anyone, for any reason. Recordings are available only to authorized individuals who have been directly provided the above instructions/link for their use. Recordings for personal use, required to facilitate your learning and preparation of personal course/lecture notes, should not be shared with others without the permission of the instructor or event coordinator. Review the University’s guidelines for faculty, staff and students entering relationships with external organizations offering access to course materials for more information on your obligations with respect to keeping copies of course materials. For more information about accessibility, connect with AccessAbility Services.

**ADMINISTRATIVE POLICY**

**Submissions**are due at **11:59 pm** on the due date.

**Extensions:**There is a “No-Excuses-Needed Extension Policy” for assignments. Each assignment has a Regular Due Date and an Extended Due Date, exactly one week apart. You don't need to ask for an extension, you can just take it. However, there is no extension beyond the extended deadline.

**Remarks:**  Requests for remarking will be accepted up to one (1) week following return of the assessment. Submit your request directly to the professor, using your uWaterloo email with the word “remark” and the name of the course in the subject line (e.g., "Remark request assignment A2 for ENBUS 406"). Provide an explanation describing in detail your request and attach a complete copy of the assignment including all comments, grading and feedback. The professor will remark the contested work, possibly including other areas of the assessment, and the mark may increase or decrease.

**Faculty Policy**

**Mental Health**: The University of Waterloo, the Faculty of Environment and our Departments/Schools consider students' well-being to be extremely important. We recognize that throughout the term students may face health challenges - physical and / or emotional. Please note that help is available. Mental health is a serious issue for everyone and can affect your ability to do your best work. Counselling Services https://uwaterloo.ca/campus-wellness/ is an inclusive, non-judgmental, and confidential space for anyone to seek support. They offer confidential counselling for a variety of areas including anxiety, stress management, depression, grief, substance use, sexuality, relationship issues, and much more.

All students are encouraged to download the WatSAFE app which is available free through the google and iOS app stores. The WatSAFE app provides on- and off-campus contacts for students in distress, including international students, and other information related to campus safety and security.

**Religious Observances**: Students need to inform the instructor at the beginning of term if special accommodation needs to be made for religious observances that are not otherwise accounted for in the scheduling of classes and assignments.

**Unclaimed assignments**: Unclaimed assignments will be retained for one year.  After that time, they will be destroyed in compliance with UW’s confidential shredding procedures.

**Communications with Instructor and Teaching Assistants**: All communication with students must be through either the student’s University of Waterloo email account or via LEARN. If a student emails the instructor or TA from a personal account they will be requested to resend the email using their personal University of Waterloo email account.

**Recording lecture:**Use of recording devices during lectures is only allowed with explicit permission of the instructor of the course. If allowed, video recordings may only include images of the instructor and not fellow classmates. Posting of videos or links to the video to any website, including but not limited to social media sites such as: facebook, twitter, etc., is strictly prohibited.

**Intellectual Property**: For further information on IP related to teaching, please see https://uwaterloo.ca/legal-and-immigration-services/sites/ca.legal-and-immigration-services/files/uploads/files/volume\_1\_issue\_3\_winter\_2018.pdf and the Guidelines for Faculty, Staff and Students Entering Relationships with External Organizations Offering Access to Course Materials, https://uwaterloo.ca/secretariat/faculty-staff-and-students-entering-relationships-external. The following text is recommended:

Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo.  Intellectual property includes items such as:

-Lecture content, spoken and written (and any audio/video recording thereof);

-Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);

-Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and

-Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student’s educational experience. However, sharing this intellectual property without the intellectual property owner’s permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights.

Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

**Co-op interviews and class attendance**: Co-op students are encouraged to try and choose interview time slots that result in the least amount of disruption to class schedules. When this is challenging, or not possible, a student may miss a portion of a class meeting for an interview. Instructors are asked for leniency in these situations; but, a co-op interview does not relieve the student of any requirements associated with that class meeting.

When a co-op interview conflicts with an in-class evaluation mechanism (e.g., test, quiz, presentation, critique), class attendance takes precedence and the onus is on the student to reschedule the interview. CEE provides an interview conflict procedure to manage these situations.

Students will be required to provide copies of their interview schedules (they may be printed from WaterlooWorks) should there be a need to verify class absence due to co-op interviews.

**University policy**

**Academic integrity**: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check [the Office of Academic Integrity](https://uwaterloo.ca/academic-integrity/) for more information.]

**Grievance:**A student who believes that a decision affecting some aspect of their university life has been unfair or unreasonable may have grounds for initiating a grievance. Read [Policy 70, Student Petitions and Grievances, Section 4](https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70). When in doubt, please be certain to contact the department’s administrative assistant who will provide further assistance.

**Discipline:**A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for their actions. [Check [the Office of Academic Integrity](https://uwaterloo.ca/academic-integrity/) for more information.] A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about “rules” for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to [Policy 71, Student Discipline](https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71). For typical penalties, check [Guidelines for the Assessment of Penalties](https://uwaterloo.ca/secretariat/guidelines/guidelines-assessment-penalties).

**Appeals:**A decision made or penalty imposed under [Policy 70, Student Petitions and Grievances](https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70) (other than a petition) or [Policy 71, Student Discipline](https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71) may be appealed if there is a ground. A student who believes they have a ground for an appeal should refer to [Policy 72, Student Appeals](https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-72).

**Note for students with disabilities:**[AccessAbility Services](https://uwaterloo.ca/disability-services/), located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

**Turnitin.com:**Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, therefore students must be given an alternative (e.g., scaffolded assignment or annotated bibliography), if they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin in this course.

It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit alternate assignment.