Course Outline

ENVIRONMENTAL TECHNOLOGY

ENVT 264
Oil Sands and Heavy Oil Industry
Winter, 2013

3 CREDITS
2 HOURS LECTURE, 3 HOURS LAB  PER WEEK

INSTRUCTOR: Neil O’Donnell
INSTRUCTOR: Neil O'Donnell

PHONE NUMBER: (780) 791-4821

E-MAIL: neil.o'donnell@keyano.ca

OFFICE NUMBER: S209g

OFFICE HOURS:
Monday 1:00 – 2:00 pm
Tuesday 2:00 – 4:00 pm
Thursday 11:00 am – 1:00 pm
Other times are possible, by appointment.

HOURS OF INSTRUCTION:
Tuesday 9:00 – 11:50 am Room S114
Thursday 2:00 – 3:50 pm Room S110

COURSE DESCRIPTION:
The course provides an overview of the oil sands industry and associated environmental issues. Topics covered include geology of the deposits, extraction processes, environmental impacts and controls, mine reclamation, physical and chemical characteristics of tailings, mining and SAGD operations, and historical development of the industry. If possible, field trips to an operating oil sands mine and a SAGD operation will be carried out.

PRE-REQUISITE(S):
ENVT254 (Oil & Gas) and ENVT256 (Mining).

COURSE OUTCOMES:
The student will be able to:
1. Summarize and give examples of the industries owning oil sands leases and the extent of current and planned operations; also of the various environmental contractors and industry organizations; including employment opportunities.
2. Summarize and analyze the history of oil sands development and current status of the industry related to the total oil & gas industry in Alberta.
3. Summarize and give examples of the mining, extraction, upgrading, tailings, and environmental operations at the open-pit mining operations in the Athabasca area.
4. Summarize and give examples of SAGD and other in-situ oil sands operations in the Athabasca and Cold Lake areas.
5. Assess and critique the media coverage (TV, Press, Internet) concerning the oil sands industry, its successes, and environmental problems.
6. Summarize and give examples of contributions to environmental improvement an environmental worker can offer, whether big or small.
7. Participate in field trips to an open pit operation, a SAGD operation, and the Oil Sands Discovery Centre.
**REQUIRED RESOURCES:**

- **Canada's Oilsands:** Canadian Centre for Energy Information, Calgary, 2007
- **Tar Sands:** by Andrew Nikiforuk: Greystone Books, Vancouver: ISBN 9 781553 655558
- **The Oil Sands:** by Gordon Kelly: Kingsley Publishing, Cochrane, AB: 9 780978 452650

**TOPICS TO BE COVERED:**

*Please Note:* This course outline may be modified to facilitate unforeseen time constraints. Date and time allotted to each topic is subject to change.

<table>
<thead>
<tr>
<th>WEEK NO.</th>
<th>LECTURE</th>
<th>LAB/FIELD TRIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to course, logistics, Definitions, Resources</td>
<td>Oilsands Video</td>
</tr>
<tr>
<td>2</td>
<td>Overviews of the Industry</td>
<td>1. History Project</td>
</tr>
<tr>
<td>3</td>
<td>History of Development</td>
<td>Review, Evaluation, Discussion</td>
</tr>
<tr>
<td>4</td>
<td>Mining &amp; Extraction</td>
<td>2. Discovery Centre or Guest Speaker</td>
</tr>
<tr>
<td>5</td>
<td>Supporting Videos</td>
<td>Review, Evaluation, Discussion</td>
</tr>
<tr>
<td>6</td>
<td>Tailings, Disposal</td>
<td>3. CONRAD exercise</td>
</tr>
<tr>
<td>7</td>
<td>SAGD, In-Situ</td>
<td>Mid-Term Exam #1</td>
</tr>
<tr>
<td>8</td>
<td><strong>Reading Week</strong></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Heavy Oil</td>
<td>Review, Evaluation, Discussion</td>
</tr>
<tr>
<td>10</td>
<td>Transportation</td>
<td>4. Class Videos</td>
</tr>
<tr>
<td>11</td>
<td>Process Upgrading</td>
<td>Review, Evaluation, Discussion</td>
</tr>
<tr>
<td>12</td>
<td>Economics</td>
<td>5. Field Trip</td>
</tr>
<tr>
<td>13</td>
<td>Environmental</td>
<td>Review, Evaluation, Discussion</td>
</tr>
<tr>
<td>14</td>
<td>Trends, Future</td>
<td>Mid-Term Exam #2</td>
</tr>
<tr>
<td>15</td>
<td>Synthesis, Review</td>
<td>6. Nikiforuk Book Chapter (1-2 chapters per week during semester, as per schedule)</td>
</tr>
<tr>
<td>16</td>
<td>Final written exam - 3 hours</td>
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</table>
MOODLE 7

Go to http://ilearn.keyano.ca

This course is supported through Moodle 7. Assignments, readings and handouts will be posted on Moodle 7. Login information will be provided by your instructor. For further instructions please see the Moodle 7 handout.

EVALUATION:

2 Midterm examinations (10 % each; Weeks 7 & 14) 20%
Final examination 30%
Lab Exercise #1 (History Project) 10%
Lab Exercise #2 (Discovery Centre or Guest Speaker) 5%
Lab Exercise #3 (CONRAD, Industry Open House/EIAs) 5%
Lab Exercise #4 (Class Videos) 10%
Lab Exercise #5 (Field Trips) 10%
#6 Nikiforuk Book Chapter (Presentation & Power Point) 10%

Reports may be modified in topic, depending on field trips, operational sites, industry functions, and/or guest speakers during the semester.

RULES FOR LABS, REPORTS, AND ASSIGNMENTS

DUE DATES

- Due Dates usually are set for one week following a lab, video assignment, report, field trip, or presentation.
- Unless specified differently by instructor, labs, reports, and assignments will be submitted electronically via Moodle.
- If submitted on or before the Due Date – full marks; may be extended another 7 days for reasonable cause approved by instructor.
- Otherwise, if submitted within one week (7 days) after the Due Date – 50% of regular mark.
- More than one week late – must be handed in, but will not be marked – zero assigned.
- Any changes due to special circumstances will be communicated by instructor via Moodle.
TERM MARK

- Will be determined from all the labs, reports, and assignments.
- Mark will be weighted average of all but one submission.
  a) If all submissions have been handed in, the lowest mark will be excluded from the calculation.
  b) If one submission is missing, the calculation will be based on the weighted average of the others. In other words, you can miss one submission without penalty.
  c) If more than one submission is missing, the calculation will include the zeros for the missing items.
  d) If 20% or more of submissions are missing, student will not be allowed to write the final exam.

GRADING SYSTEM:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Description</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>Excellent</td>
<td>4</td>
</tr>
<tr>
<td>A</td>
<td>Excellent</td>
<td>4</td>
</tr>
<tr>
<td>A-</td>
<td></td>
<td>3.7</td>
</tr>
<tr>
<td>B+</td>
<td>Good</td>
<td>3.3</td>
</tr>
<tr>
<td>B</td>
<td>Good</td>
<td>3</td>
</tr>
<tr>
<td>B-</td>
<td></td>
<td>2.7</td>
</tr>
<tr>
<td>C+</td>
<td>Satisfactory</td>
<td>2.3</td>
</tr>
<tr>
<td>C</td>
<td>Satisfactory</td>
<td>2</td>
</tr>
<tr>
<td>C-</td>
<td></td>
<td>1.7</td>
</tr>
<tr>
<td>D+</td>
<td>Minimal Pass</td>
<td>1.3</td>
</tr>
<tr>
<td>D</td>
<td>Minimal Pass</td>
<td>1</td>
</tr>
<tr>
<td>F</td>
<td>Failure</td>
<td>0</td>
</tr>
</tbody>
</table>

Students intending to transfer to other institutions should strive for a ‘C-’ as a minimum.
Transfer information on each course is available at the Alberta Council on Admission and Transfers.

NOTES:

Please dress appropriately for the weather on any field trips! Proper footwear is important. If the weather does not co-operate, the lab schedule will shift.
Individual components of the course will be given a numerical mark. The grading system will be applied using a combination of absolute achievement and relative standing in the class.
MISSED TERM EXAM OR LABS:
A student who cannot write a term examination or complete a lab assignment due to incapacitating illness, severe domestic affliction or other compelling reasons can apply to have the weight of the missed midterm transferred to the final. All attempts should be made to make up missed labs. Missed labs with no attempts to complete the work will be assigned a “0”. You must notify the instructor of a missed midterm or lab assignment within 48 hours. Deferral of term work is a privilege and not a right; there is no guarantee that a deferral will be granted. Misrepresentation of Facts to gain a deferral is a serious breach of the Code of Student Behaviour.

CELL PHONES: Cell phones and other electronic devices are to be turned off during class times. If you need to use one, leave the room. If you have to text someone, leave the room.

STUDENTS WITH DISABILITIES: Students who require accommodation in this course due to a disability are advised to discuss their needs with counsellors in the Registrar’s office. Please ensure that the required forms for exams are submitted to the instructor one week before the date of midterms or by the last lecture class for the final exam.

SKILL CENTRE: Students who require additional help in developing strategies for better time management, study skills or examination skills should contact the Keyano College Skill Centre.

Disclaimer: Any typographical errors in this Course Outline are subject to change and will be announced in class. The date of the final examination is set by the Registrar.

Note: Recording is permitted only with the prior written consent of the instructor or if recording is part of an approved accommodation plan.

Students should consult pp.30-31 on http://keyano.ca/sites/default/files/a_files/calendars/keyano.calendar.credit(2012-2013).pdf

IMPORTANT DATES:

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 7, 2013</td>
<td>First day of classes</td>
</tr>
<tr>
<td>January 18, 2013</td>
<td>Courses dropped after this date will be designated “W”. (A withdrawal (W) is not reflected in your GPA).</td>
</tr>
<tr>
<td>February 25 – March 1, 2013</td>
<td>Reading Week</td>
</tr>
<tr>
<td>March 8, 2013</td>
<td>Courses dropped after this date will be designated “WF”. (A withdrawal failure (WF) counts as a 0 in your GPA).</td>
</tr>
<tr>
<td>April 19, 2013</td>
<td>Last day of classes</td>
</tr>
<tr>
<td>April 22-30, 2013</td>
<td>Final Exams</td>
</tr>
</tbody>
</table>
COLLEGE POLICIES

Equality, Equity and Respect
The Keyano College is committed to providing an environment of equality, equity and respect for all people within the College community. All members of this community are considered partners in developing teaching and learning contexts that are welcoming to all. Faculty, staff, and students are encouraged to use inclusive language to create a classroom atmosphere in which students' experiences and views are treated with equal respect and valued in relation to their gender, ethnic and cultural background, and sexual orientation.

Students should consult:
http://keyano.ca/current-students/individual-rights

Plagiarism and Cheating
Every student expects to be treated and evaluated fairly in a course. Plagiarism and cheating robs everyone of this right.

No student may submit words, ideas or data of another student or person as his or her own in any writing, project, assignment, quiz, electronic presentation, exam etc. Any work used that is not the student's own must be clearly cited as belonging to someone else. There are penalties for using other's work and not citing it. The Student's Rights & Responsibilities document clearly outlines these penalties and the appeal process.

- No learner can obtain information from another student during an exam.
- No learner can bring unauthorized information (paper or electronic) into an exam or quiz.
- No student can submit work done in another course for grading in this course without the written prior approval of the course instructor.
- No student can submit copyright protected or commercially produced materials as part or all of an assignment without proper citation & permission.

Student Rights & Responsibilities
Students should consult the Keyano College Credit Calendar or online at:
http://www.keyano.ca/Media/Collections/Calendars/Keyano.Calendar1112-10-full.pdf

Specialized Supports and Duty to Accommodate
Disability Support Services: Learner Assistance Program
If you have a documented disability or you think that you would benefit from some assistance from a Disabilities Counsellor, please call or visit the Disability Supports Office 780-792-5608 to book an appointment (across from the library). Services and accommodations are intended to assist you in your program of study, while maintaining the academic standards of Keyano College. We can be of assistance to you in disclosing your disability to your instructor, providing accommodations, and supporting your overall success at Keyano College.

Specialized Supports and Duty to Accommodate
Specialized Support and Duty to Accommodate are aligned with the office of Disability Support Services: Learner Assistance Program (LAP) guided by federal and provincial human rights legislation, and defined by a number of Keyano College policies. Keyano College is obligated by legislation to provide disability-related accommodations to students with identified disabilities to the point of undue hardship.
Course Outline

ENVIROMNENTAL TECHNOLOGY

ENVT 264
Oil Sands and Heavy Oil Industry
Winter, 2013

3 CREDITS
2 HOURS LECTURE, 3 HOURS LAB PER WEEK

_____________________________   _____________________________
Neil O’Donnell, Instructor   Date

Reviewed and approved by:

_____________________________   _____________________________
Louis Dingley, Chairperson   Date

_____________________________   _____________________________
Guy Harmer, Dean   Date