Overview:
Natural Resources and Natural Resources Sustainable Projects provide mankind with important ecosystem services such as Clean Water, Sustainable Clean Environment, Energy, Energy Renewables and Energy Non-Renewables, Minerals and Biological resources from terrestrial and marine ecosystems, which are essential for the survival and development of mankind. And for new urban development, special mention to new and smart cities, and rural development. However, the increasing demands for these natural resources, due to the growth of the human population, International Geo-Political Strategy, high demand of minerals for the manufacture of IT and new technology devises for all different fields and applications, including ecommerce, Manufacturing, New industrial innovations and processes, new technologies, Health care new devises, Transportation advancement and automation, for power generation and distribution and rapidly global urban development (e.g. China and India), combined with the decrease in availability of these finite resources, 2021, and the current accelerated effects of Climate Change worldwide, All this new realities, bring about an urgent calls for new sustainable management on projects related to Natural Resources (2021) and the application of new best Management practices with much more efficient usages of Natural Resources, and the implication on Natural resources projects and project management, 2021, for fixing the ill linear economy we are all living transforming it into a real Sustainable New Circular Economy: Reuse, Recycle, Repair, Redesign for sustainability and Conservation of Natural Resources.

Course Description:
This course aims to help students develop the necessary Management capabilities required from engineers working nowadays on Sustainable Natural Resources Projects and Natural Resources Public and Private enterprises and/or on Joint Ventures related to Natural Resource Projects with post-pandemic future, offering a unique view of the interdisciplinary challenges that are present today in 2021, on this field and provides the knowledge to identify and develop sustainable solutions. Learning the necessary management tools, like analysis of the role of the different Stakeholders for the project, Project Finance-Non Recourse Financing, P3 Public Private Partnership, economical and international geo-political and political conditions and environment, Project Social considerations including The Social Benefit of the project and also The Triple Bottom Line: People-Planet-Profit, Sustainable Project Risk analysis and life cycle considerations in the project (Projects on Water, Environment, Energy, New Energy sources, Mining, Fishing, Rivers, lakes, Forest, Local climate change projects are areas of Natural Resources projects in this course).

The importance of Natural Resource project’s Long-Term Values on Environmental, Social, Economic and Governance, are fundamental factors in this course.

We will analyze real case studies based on the management of Natural Resources Projects, on Public sector, private sector, P3-Public Private Partnership, and public enterprises that oversee planning and developing national resources not only in Canada but also internationally in developed countries and developing countries. We will have guest speaker with experience in different Natural Resource Projects not only in Canada but also Internationally.
Students will be evaluated as follows:

- 25% participation in class, case studies and assignments
- 40% group or individual project
- 35% final test

During the course there will be tutorials by appointments.

Course Content:

1) Introduction
   - 1.1) Natural Resources and Management, -2021- The water Crisis. Energy. Sustainability and the new Circular Economy-Reuse-Recycle-Re-Design
   - 1.2) Natural Resources: People and Planet, economical aspects. China & India
   - 1.3) The need for Natural Resources Management and related Enterprises
   - 1.4) Natural Resources Planning Issues, Fiscal Deficits and Natural Resources
   - 1.5) Improving Public Enterprise for Natural Resource Management
   - 1.6) Performance measurement within the Public Enterprise
   - 1.7) Natural Resources in Canada
   - 1.8) The Present: Development and the extractive Industries

2) Management Objective-Managing Tools on Natural resources Projects
   - 2.1) Benefits / Costs Analysis in Natural Resources Management
   - 2.2) Policy, Planning, Organization and Administration as a Management System
   - 2.3) Public Enterprise, Private Enterprise, PPP and Advocacy System
   - 2.4) Planning Process and Stakeholders
   - 2.5) Examples of Agency Planning
   - 2.6) Water Management Project: Public Enterprise and Management

3) Natural Resources Enterprises Business and Coordination

4) Natural Resource Project and Enterprises Management
   - 4.1) Management Tools
   - 4.2) Benefit Cost Analysis
   - 4.3) Financial Management:
     - 4.3.1 Capex & Opex
     - 4.3.2 Project Finance: issuing bonds and Cash Flow forecast
   - 4.4) Project Management within the Public Enterprise
   - 4.5) Process Management, KPI and KGI
   - 4.6) Team oriented organization within the Public Enterprise and Projects.

5) National Funds managing Natural Resources proceeds, Investing Internationally
   - 5.1) Example to follow: The Government National Pension Fund of Norway.
   - 5.2) Other State-Owned Funds on Natural Resources Management.

6) International Contracts and Investment in Natural Resources Management.
   - 6.1) P3
   - 6.2) Type of Contracts
   - 6.3) Concerns dealing with Expropriation
7) Case Studies and Lessons Learned
   - 7.1) Nuclear Energy Project in Canada
   - 7.2) Water Project Management
   - 7.3) A Canadian Company developing an Energy Project in Colombia
   - 7.4) Risk Management in Natural Resource Projects

8) Sustainable Energy, Projects and Management. Renewables & non-Renewables
   - 8.1) Managing the Need for Natural Resources as Energy Sources
   - 8.2) Current effects of international geo-political environment.
     - Trade war China-USA
   - 8.3) Other main players on natural resources-2021: Russia, Australia, Canada
   - 8.4) Carbon Sequestration on non-renewables
   - 8.5) Natural Resources and Minerals Project Management and Risks, including project risk in the post-pandemic world

9) The present 2021:
   - 9.1 Discussion on AI, ML, Big Data and Blockchain:
     Innovation on natural resource management & projects, The New Economy,
   - 9.2 The big race for 5G:
     Strategies and international projects on Natural Resources.
   - 9.3 Climate change and new areas of natural resources and projects -2021.

10) The Future:
    Natural Resources Projects and Management, an Optimistic Approach-2021
    Conservation of Natural Resources.

Academic references for this course:

Required:
   - New Course Pack 2019 for APS1009H * U. of T., Prof. Eduardo Fernandez
   - Harvard Business Publication and Stanford University Case Studies (TBA)
   - No Textbook is required

Suggested text for additional relevant learning:
## Day to Day Calendar-DRAFT

**Start Date:** Thursday, September 9th  
**End Date:** Thursday, December 2nd

<table>
<thead>
<tr>
<th>Week #</th>
<th>Date</th>
<th>Topics</th>
<th>Reading &amp; Assignment</th>
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<tbody>
<tr>
<td>6</td>
<td>10/14/21</td>
<td>Sustainable Energy and Natural resources</td>
<td>TBA</td>
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<tr>
<td>7</td>
<td>10/21/21</td>
<td>International Business Cases in Natural resources Nuclear Energy Project in Canada</td>
<td>TBA</td>
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<tr>
<td>8</td>
<td>10/28/21</td>
<td>Improving Public Enterprise Performance in Management of Natural Resources. KPI and KGI</td>
<td>The TNK-BP joint venture</td>
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<td>9</td>
<td>11/04/21</td>
<td>Sustainability- Environmental Impact and Health concern with Natural resources development-CSR -Conflict Minerals-</td>
<td>Sino Iron in Australia</td>
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<td>12</td>
<td>11/25/21</td>
<td>Group Final Team Project Presentations</td>
<td>FINAL EXAM TBA</td>
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<tr>
<td>13</td>
<td>12/02/21</td>
<td>Group Final Project Presentation -Final Exam</td>
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*Note: TBA = To Be Announced*
Some of The Management Tools to be learned in this course of Natural Resources Projects and Management for your learning process and the team final project:

The Sustainable Project and Strategy
Stakeholder mapping and initial analysis.
Project Finance in Natural Resource Development and projects.
The Concept of Project Finance as non-recourse financing. P3. The participants and their roles.
Project Finance Documents and terms -DBFOT-BOT-BOOT
SWOT Analysis
Life Cycle consideration on the Project and after.
Canvas Business Model for Natural Resource Projects.
CAPEX-OPEX
Cash Flow Forecast
Factors on Project Risk Analysis for Natural Resource Projects.
Managing Stakeholders and Coordination within the Enterprise and/or within the Project.
The New Circular Economy consideration.
Board of Director’s role and best practices. Environmental, Social, Economic and governance.
Lessons to be learned from The Instructor’s experience plus experienced guest speaker.