

APS1009 COURSE: Natural Resources Projects & Management -2023

INSTRUCTOR: Prof. Eduardo Fernandez

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 devices for all different fields and applications, including e-commerce, Manufacturing, New industrial innovations and processes, new technologies, Health care new devices, 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, 2023, and the current accelerated effects of Climate Change worldwide; All these new realities, bring about an urgent call for a more new sustainable management on projects related to Natural Resources (2023) 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, 2023, 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 2023, 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's 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 ,Global and Local climate change projects are areas of Natural Resources projects in this course).

The importance of Natural Resource project's Long-Term Values and Positive Impacts related to Environmental, Social, Economic and Governance factors, are all 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 international guest speakers with experience in different Natural Resource Projects, not only in Canada but worldwide.

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 (NR) and Management, -2023- The Water Crisis. Energy. Sustainability and the New Circular Economy-Reuse-Recycle-Re-Design
- 1.2) Natural Resources: People- Planet, and the Economy. China, India, and Russia.
- 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 a more sustainable Management of NR
- 1.6) Performance measurement within the Public Enterprise, PPP, or JV.
- 1.7) Natural Resources in Canada
- 1.8) The Present: Sustainable Development and the extractive Industries
- 1.9) Life Cycle Assessment; Key elements, Example of Preliminary Flowchart for LCA
- 1.10) Natural Resource Economics and Externalities. Ai and the environment 2023

2) Management Objective-Managing Tools on Natural resources Projects-2023

- 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
- 2.7) Introduction to Environmental Assessment
- 2.8) Introduction to Environmental Remediation
- 2.9) Energy transition, a Global perspective -2023

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 in NR under 3Ppartnership and within the Public Enterprise
- 4.5) Process Management, KPI and KGI
- 4.6) Team oriented organization in NR Projects,3P and Public Enterprises

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 Projects and Management.

- 6.1) Type of Contracts
- 6.2) Concerns dealing with Expropriation
- 6.3) Partnership with National Development Agency, example EDC and CCC/Canada

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 and Cash Flow 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- Conflict with Russia and International Energy Geopolitics
- 8.3) Other main players on Natural Resources-2023: 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 2023:

9.1 Discussion on AI, ML, Big Data and Blockchain:

Innovation on Natural Resource Management & Projects, The New Economy,

9.2 Strategies and international projects on Natural Resources

9.3 Climate change and new areas of Natural Resources and Projects -2023.

9.4 Energy Transition.

10) The Future:

Natural Resources Projects and Management, an Optimistic Approach-2023

Conservation of Natural Resources.

Academic references for this course:

Suggested texts for learning:

- New Course Pack for APS1009H * U. of T., Prof. Eduardo Fernandez
 - Introduction to Environmental Assessment;4th edition Bram F. Noble
 - Stanford Graduate School of Business Case Studies (TBA)
- No Textbook is required.

Suggested text for additional relevant learning:

- Sustainable Energy. Cengage Learning. By Dunlap, Richard. 2019.
- Natural Resource Management and The Circular Economy. By Brears, Robert. Springer-2018
- Environmental Sustainability for Engineers and Applied Scientist-2019.By Greg Peters and Magdalena Svanstrom, Cambridge University Press.
- Canada Natural Resources 5th Edition-Oxford- Edited By Bruce Mitchell

Day to Day Calendar-DRAFT-Start Date: Thursday, Sep. 15th; to Thursday, Dec. 8th

Week #	Date	Topics	Reading & Assignment
1	09/14/23	Introduction to Sustainable Projects on Natural Resources Management and Enterprise. Project Description. The Circular Economy. Sustainability and The New Economy. Developing Countries: Usages of NR Planning, Policy, Mngt. and Administration. Fiscal deficits. Commodities trade & Price: LME Analysis Tools: SWOT-PESTLE Analysis in NR Projects. Introduction to LCA/Flowchart for LCA	Sustainability Climate Change/effect on Natural Resources (TBA).NR Projects, Natural Resource Management and The Circular Economy. SWOT-analysis Mitigation of Climate C.
2	09/21/23	Business responds to Sustainability-Investment. Issues on Public Natural Resources Enterprises. Business Overview on Natural Resources, PPP, Benefit-Cost Analysis- Global Energy Transition International Natural Resources Project Finance/ Non-Recourse Financing. The Stakeholder Map/ Management Process	PESTLE- analysis Water Issues Water Crisis in India TBA
3	09/28/23	Financial Management, CAPEX & OPEX, Cash Flow Forecast, Cash Flow & Country Risk Process Management, BPM & BPT, Natural resources Management in Canada	The Resource Gap/Canada Mining and Energy
4	10/05/23	National Funds managing Natural Resources proceeds. Development Agencies. International Contracts and Investment/ Natural Resources. PPP- Public Private Partnership	Business case/TBA Natural Res. Contract Renegotiations
5	10/12/23	International Natural Resources Management Case Studies, Lessons Learned Water Project Management and financing from Regional Development Banks Rethinking Institutions for NR Management, Financial Statement, and Cash Flow Risk	Water Crisis – Canada Article and Case.
6	10/19/23	Introduction to Environmental Assessment and Environmental Remediation Sustainable Energy and Natural Resources Projects Carbon Sequestration, guest speaker/ World Bank	TBA
7	10/26/23	International Projects in Natural resources with PPP Nuclear Energy Project in Canada- PPP Guest speaker: World Bank Financing -Manager	TBA
8	11/02/23	Improving Public Enterprise Performance in Management of Natural Resources. KPI and KGI Guest speaker on IPO experience-Project Finance	International Joint venture in renewables project - Canada- France/ TBA
9	11/16/23	Environmental Impact and Health concern in NR Development-Conflict Minerals- Climate Change Conference Dubai-2023 Guest speaker- World Bank	Sino Iron in Australia
10	11/23/23	A Canadian Company developing Energy Project in Colombia- International Guest Speaker -CSR- Risk Management in Natural Resource Projects	The Galore Creek Project.
11	11/30/23	The Future,2023 NR Projects: Digital. Optimistic Approach, Carbon Capture/ New Technologies. Roles of Board of Directors on new NR projects Group Team Final Project Presentations	Final Team project presentation & report Project Paper Due -TBA
12	12/07/23	Group Final Project Presentation -Final Exam	FINAL EXAM TBA

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		Tutorials	TBA
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Some of The Management Tools/Concepts, to be learned in this 2023 course of Natural Resources Projects and Management, for your learning process and for the term final project:

The Sustainable Project and Strategy/ CANADA

The New Circular Economy consideration.

Life Cycle consideration on the Project and after

Key elements of LCA

Stakeholder mapping and initial analysis

Natural Resource Economics and Externalities

Benefit-Cost Analysis for Natural Resource Projects.

International Water Projects and Global Energy Transition- 2023

Project Finance in Natural Resource Development and Projects. Non-Recourse Financing

The Concept of Project Finance as non-recourse financing and P3. The participants and their roles.

Project Finance Documents and terms -DBFOT-BOT-BOOT

PPP- Public Private Partnership in Natural Resource Projects

Introduction to Environmental Impact Assessment and Environmental Remediation

Canadian System of Environmental Economic Accounts; Natural Resource Asset Accounts (NRAA)

Multilateral International Development Banks Financing Environmental Projects

Mitigation of Climate Change -Projects-Summary for Policy Makers

Financial Statement and Performance Measurement -Project Evaluation

SWOT Analysis- PESTLE analysis on NR Projects.

Business Process Analysis and Business Process Management for Natural Resource Projects.

Canvas Business Model for Natural Resource Projects.

Financial analysis: 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 NR Project.

Board of Director's role and best practices. Environmental, Social, Economic and Governance.

Lessons to be learned from The Instructor's experience, and from international guest speakers.

Instructor - Eduardo Fernandez

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