



**NATIONAL UNIVERSITY OF ENGINEERING**  
**COLLEGE OF ENVIRONMENTAL ENGINEERING**  
**ENVIRONMENTAL ENGINEERING PROGRAM**

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**GA142 – ECO-EFFICIENCY, SOCIAL RESPONSIBILITY AND ENVIRONMENTAL ETHICS**

**I. GENERAL INFORMATION**

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| <b>CODE</b>           | : GA142 – Eco-efficiency, social responsibility and environmental ethics |
| <b>SEMESTER</b>       | :  |
| <b>CREDITS</b>        | : 03   |
| <b>HOURS PER WEEK</b> | : 04 (Theory – Practice)   |
| <b>PREREQUISITES</b>  | : GA141<br>GA151   |
| <b>CONDITION</b>      | : Mandatory  |

**II. COURSE DESCRIPTION**

World policies and trends. Economic growth, social equity and ecological value as objectives of eco-efficiency, social responsibility and environmental ethics. The eco-efficiency, life cycle of the products. Eco-efficiency opportunities. Toolbox for its implementation. Best techniques available. Indicators, ecological footprint, water footprint, carbon neutral, among others. Social responsibility, ecological compensation. Environmental ethics application of the technologies of the future. Principle of precaution and sustainable development.

**III. COURSE OUTCOMES**

By the end this course the student will:

- Know the most important strategies to achieve sustainable development. Analyze the pressures on resources for development and the impacts of its waste on the ecosystem, product of population growth, the highest quality and life expectancy that exists as well as the concentration of the population in cities.
- Develop technical capacity to identify eco-efficiency opportunities and develop alternatives based on the selection of the best available technique including nanotechnology. Establish social responsibility and business ethics as a basis for business and social development for its sustainability.

**IV. LEARNING UNITS**

**THEMATIC UNIT I: Eco-efficiency, population growth and healthy material cycle.**

Introduction to eco-efficiency, social responsibility and corporate environmental ethics. / Case of environmental services. / Population growth and greater life expectancy. / Analysis of population and economic growth. The pressure on the resources and ecosystems of millions of people who leave poverty each year, in the case of the BRICS (Brazil, Russia, India, China and South Africa). / Demographic bonus in sustainable development. / Peru case bonus of 2015-2050. / Healthy cycle of materials. Life cycle and sustainable development. / Case of the

3R (Reduce, reuse and recycle), / Eco-efficiency from the point of view of the World Business Council for Sustainable Development (WBCSD) and the Organization for Economic Cooperation and Development OECD. / Case of eco-efficiency in Peru according to the National Environmental Policy and the National Environmental / Action Plan to 2021.

**THEMATIC UNIT II: Nanotechnology and best available technique in eco-efficiency.**

Nanotechnology Bits, Atoms, Neurons and Genes. Nanomaterials Nanoparticles, nanotubes, nanocomposites, others. Properties of nanomaterials and their relationship with macroparticles. / Case of technologies do BANG. / Eco-efficiency in the public sector. Application of eco-efficiency to public government actions. / Peru case eco-efficiency in the public sector with mandatory character. Mandatory reporting indicators. / Business eco-efficiency Development of the best available technique. / Case of application of eco-efficiency to the productive processes. / Best technique Available. Technological alternatives for sustainable development. / Case of selection of technological alternatives for the application of eco-efficiency in the public sector.

**THEMATIC UNIT III: Ecoefficiency indicators.**

Measurement of eco-efficiency. Environmental footprints / Determination of main footprints linked to production and consumption patterns. / Eco-efficiency, global, local and business indicators. / Case of companies and public institutions.

**THEMATIC UNIT IV: Social responsibility and environmental ethics.**

Concept of social responsibility and environmental ethics. / Corporate social responsibility. / Environmental ethics

**V. LABORATORIES AND PRACTICAL EXPERIENCES**

Magisterial exhibitions, discussion workshops and case studies will be held. For each main topic readings will be developed. For the practical part, a study of cases of preference of the national reality will be developed. The analysis and debates on practical cases will be used to consolidate learning. The practices allow to develop capacities for the critical analysis of the processes of eco-efficiency and social responsibility that are developed in Peru and the world.

**VI. METHODOLOGY**

Master lectures and group dynamics will be used as well as systematized reviews in the case studies. For the development of the exhibitions multimedia projector, videos and transparencies will be used. As well as a computer for the presentation of images, graphics, tables and text. Printed material consisting of selected short readings and computer files of the presentations and reference documents used as support.

**VII. EVALUATION FORMULA**

The learning will be evaluated through the "G" system.

- Partial Exam: Weight 1
- Final Exam: Weight 1
- Average of Practices: Weight 1. Four practices are taken, one is eliminated.

Calculation of the Final Average:

$$FA = \frac{PE + FE + \frac{QP1 + QP2 + QP3}{3}}{3}$$

PE: Partial Exam; FE: Final Exam, QP: Qualified Practice

## VIII. BIBLIOGRAPHY

- Eco-efficiency. World business council for sustainable development (WBCSD) 1991.
- Guía para la ecoeficiencia. Fundación fórum ambiental. Barcelona, España.
- [www.forumambiental.org](http://www.forumambiental.org).
- Guía de ecoeficiencia para instituciones del sector público. Publicación del Ministerio del Ambiente. [www.minam.gob.pe](http://www.minam.gob.pe).
- Guía de ecoeficiencia para empresas. Publicación del Ministerio del Ambiente. [www.minam.gob.pe](http://www.minam.gob.pe).
- Prospectiva Medioambiental de la OCDE para el 2030. Publicación de la OECD. <http://www.oecd.org/env/indicators-modelling-outlooks/40224072.pdf>
- Medidas de ecoeficiencia para el sector público del Perú. Decreto Supremo N° 009-2009-MINAM y su modificatoria el Decreto Supremo N° 011-2010-MINAM.
- Política Nacional del Ambiente. Decreto Supremo N° 012-2009-MINAM. Publicado en el diario oficial El Peruano el 23 de Mayo del 2009.
- Plan Nacional de Acción Ambiental PLANAA 2011-2021. Decreto Supremo N° 014-2011-MINAM. Publicado en el diario oficial El Peruano el 9 de julio del 2011 y en Separata Especial el texto completo el 14 de julio del 2011.
- Programa de las Naciones Unidas sobre el Medio Ambiente. Conferencia de las Naciones Unidas sobre el Medio Ambiente y el Desarrollo, Programa 21. PNUMA, Nairobi, Kenia.1992. Rio+10 Sudáfrica. Río +20 Brasil.
- Selected readings delivered each week for theory and practice.