



**A) COURSE**

Course Id:	Course
5930	ENVIRONMENTAL ENGINEERING AND MANAGEMENT

Class Hours per Week	Lab hours per week	Complementary practices	Credits	Total hour course
0	3	0	3	48

**B) GENERAL COURSE INFORMATION:**

	EE (IEA)	ME (IM)	MME (IMA)	EME (IME)	MTE (IMT)
<b>Level:</b>	VI	VIII	VIII	VIII	VIII
<b>Course Type (Required/Elective)</b>	REQUIRED	REQUIRED	REQUIRED	ELECTIVE	REQUIRED
<b>Prerequisite Course:</b>	225 Créditos	225 Créditos	225 Créditos	180 Créditos	180 Créditos
<b>CACEI Classification:</b>	ES	ES	ES	ES	ES

**C) COURSE OBJECTIVE**

**At the end of the course, the student will be capable of:**

Define, describe and discuss issues of impact and environmental management, taking into account scientific, economic and technological basis, you can develop and implement engineering projects, with the aim of promoting sustainable development.

**D) TOPICS (CONTENTS AND METHODOLOGY)**

<b>1. Engineering and Sustainable Development</b>		<b>2 Hours</b>
<b>Specific Objective:</b>	Objective 1: Students learn topics of Environmental Engineering in an overview starting with the basics and topics related to environmental sciences.	
	1.1. Introduction to sustainable development 1.2. Green engineering	
<b>Readings and other resources</b>	Books, Articles, Further literature, Internet Links.	
<b>Teaching Methodologies</b>	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.	
<b>Learning Activities</b>		

<b>2. The nature and extent of environmental problems</b>		<b>5 Hours</b>
<b>Specific Objective:</b>	Students know and analyze environmental problems and their nature as well as control methods and treatments.	



2.1 Interaction Systems 2.2 Environmental Disturbances 2.3 The Role of Technology 2.4 Quantification of environmental problems	
<b>Readings and other resources</b>	Books, Articles, Further literature, Internet Links.
<b>Teaching Methodologies</b>	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.
<b>Learning Activities</b>	

<b>3. Environmental Impact</b>		<b>8 Hours</b>
<b>Specific Objective:</b>	The student will know the basis for conducting an environmental impact assessment and understands its importance as a tool for environmental management.	
3.1 Environmental Considerations 3.2 Environmental Impact Assessment 3.3 Methodologies for Environmental Impact Assessment 3.4 Environmental Impact Manifestation 3.5 Example of Environmental Impact Study		
<b>Readings and other resources</b>	Books, Articles, Further literature, Internet Links.	
<b>Teaching Methodologies</b>	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.	
<b>Learning Activities</b>		

<b>4. Environmental Laws</b>		<b>8 Hours</b>
<b>Specific Objective:</b>	<ul style="list-style-type: none"> <li>• The student will know the levels of competence in environmental matters in Mexico, and know what are the major federal, state and local environmental laws on this issue.</li> <li>• The student becomes aware of the existence of other international standards for quality and environmental quality.</li> <li>• Students will recognize the benefits of environmental auditing system as an instrument of environmental management</li> </ul>	
4.1. Mexican environmental regulations general. Law of ecological balance and environmental protection. Other federal laws (national water law, mining) 4.2 Mexican Official Rules (transport of hazardous waste, environmental issues). 4.3 Federal, state and municipal competencies in environmental management. 4.4 ISO 9000. ISO 14000. 4.5 Environmental audits..		
<b>Readings and other resources</b>	Books, Articles, Further literature, Internet Links.	
<b>Teaching Methodologies</b>	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.	
<b>Learning Activities</b>		

<b>5. Prevention and control of water pollution</b>		<b>8 Hours</b>
<b>Specific Objective:</b>	The student will know the different forms of prevention and control of water pollution, and to identify and understand the methods of physical, chemical and biological wastewater treatment.	
5.1 Administration water quality. 5.2 Water treatment. 5.3 Wastewater Treatment.		
<b>Readings and other resources</b>	Books, Articles, Further literature, Internet Links.	
<b>Teaching Methodologies</b>	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.	
<b>Learning Activities</b>		

<b>6. Prevention and control of air pollution</b>		<b>8 Hours</b>
<b>Specific Objective:</b>	The student will know the different forms of prevention and control of air pollution, and to identify and understand the treatment methods of cleaning gases and particulate emissions.	



6.1 Major air pollutants. 6.2 Forms control and elimination of air pollutants. 6.3 Control and disposal of gaseous emissions. 6.4 Control and particle removal. 6.5 Applications Control Technology 6.6 Case studies. Emission control in different industrial turns. 6.7 Measurement of air pollutants	
<b>Readings and other resources</b>	Books, Articles, Further literature, Internet Links.
<b>Teaching Methodologies</b>	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.
<b>Learning Activities</b>	

<b>7. Solid Waste Management</b>		<b>7 Hours</b>
<b>Specific Objective:</b>	<ul style="list-style-type: none"> <li>• The student will know different techniques for reducing the generation of municipal waste, and industrial hazardous and non-hazardous, recycling and proper handling.</li> <li>• Students will understand the methods of physical, chemical and biological treatment of hazardous waste treatment.</li> </ul>	
7.1 Solid Waste Management (RS) non-hazardous 7.2 Materials Management and hazardous waste (HW)		
<b>Readings and other resources</b>	Books, Articles, Further literature, Internet Links.	
<b>Teaching Methodologies</b>	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.	
<b>Learning Activities</b>		

<b>8. Antipollution equipment</b>		<b>2 Hours</b>
<b>Specific Objective:</b>	Students know new remediation technologies of industrial processes and non-polluting energy sources.	
8.1 Antipollution equipment		
<b>Readings and other resources</b>	Books, Articles, Further literature, Internet Links.	
<b>Teaching Methodologies</b>	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.	
<b>Learning Activities</b>		

**E) TEACHING AND LEARNING METHODOLOGIES**

- a) Strategies Expository
- b) Problem-based learning
- c) Collaborative Work

**F) EVALUATION CRITERIA:**

Evaluation:	Schedule	Suggested Form of Evaluation and weighing	Topics
1er. Evaluation Partial	Session 18	Exam 80% , Homework 20%,	Unity 1,2,3
2º Evaluation Partial	Session 32	Exam 80% , Homework 20%,	Unity 4,5
3er. Evaluation Partial	Session 48	Exam 80% , Homework 20%,	Unity 6,7,8
Evaluation Final Ordinary		100% Average partial evaluations	
Other Activity:			
Exam Extraordinary	Week 17 of the semester in	100% Exam	100% Program



	progress		
Exam of title	According to schedule school secretary	100% Exam	100% Program
Exam regularization	According to schedule school secretary	100% Exam	100% Program

**G) BIBLIOGRAPHY AND ELECTRONIC RESOURCES**

TEMA 1. PRINCIPIOS GENERALES DE INGENIERIA AMBIENTAL.

1. SEOÁÑEZ C., MARIANO, INGENIERÍA MEDIOAMBIENTAL APLICADA, EDICIONES MUNDI-PRENSA. (1997).
2. SEOÁÑEZ C., MARIANO, ECOLOGÍA INDUSTRIAL: INGENIERÍA MEDIOAMBIENTAL APLICADA A LA INDUSTRIA Y A LA EMPRESA, EDICIONES MUNDI-PRENSA, (1998).
3. SEOÁÑEZ C., MARIANO, AUDITORIAS MEDIOAMBIENTALES Y GESTIÓN MEDIOAMBIENTAL DE LA EMPRESA, EDICIONES MUNDI-PRENSA (1995).

TEMA 2. IMPACTO AMBIENTAL.

1. APUNTES DEL CURSO DE IMPACTO AMBIENTAL. PUMA, UNAM (1997). PP.27.
2. DOCUMENTO DE EMPRESA PEÑÓLES.
3. CONESA F., V., VÍTORA, GUÍA METODOLÓGICA PARA LA EVALUACIÓN DEL IMPACTO AMBIENTAL, EDICIONES MUNDI-PRENSA. (1997). CAPS. 6.1 Y 6.2

ARTÍCULOS:

- F. VILLAMAR L., EVALUACIÓN DE IMPACTO AMBIENTAL. UNA HERRAMIENTA. COMISIÓN NACIONAL DEL AGUA. CONGRESO FEMISCA (1997).
- SEMARNAP. MANIFESTACIÓN DE IMPACTO AMBIENTAL PARA LA AMPLIACIÓN DEL AEROPUERTO INTERNACIONAL DE LA CIUDAD DE MÉXICO. 1987.
- MINERA SAN XAVIER. NOTIFICACIÓN PÚBLICA DE LA PRESENTACIÓN DE LA MANIFESTACIÓN DE IMPACTO AMBIENTAL EN SU MODALIDAD GENERAL DEL PROYECTO MINERO-METALÚRGICO CERRO DE SAN PEDRO SAN LUIS POTOSÍ.
- SEMARNAP. LEGEEPA. SECCIÓN V. EVALUACIÓN DE IMPACTO AMBIENTAL.
- GARZA R.. LA EVALUACIÓN DE IMPACTO AMBIENTAL EN MÉXICO. MITOS Y REALIDADES. DEPARTAMENTO DE RECURSOS NATURALES, ITESM CAMPUS

**Main Books**

- SOLANO A. SISTEMA DE ACREDITACIÓN DE CALIDAD TÉCNICA DE LA EVALUACIÓN DE IMPACTO AMBIENTAL, RIESGO Y MANEJO DE RESIDUOS PELIGROSOS. REVISTA FEMISCA A. C., AÑO 9, NO. 32, ABRIL – JUNIO 1997. MÉXICO.

TEMA 3. NORMATIVIDAD AMBIENTAL Y AUDITORIAS AMBIENTALES.

1. NIETO CARAVEO Y L. M. NIETO CARAVEO, NOTAS DEL CURSO MARCO LEGAL DE LA GESTIÓN AMBIENTAL DEL PROGRAMA DE CAPACITACIÓN EN GESTIÓN AMBIENTAL Y ECOLOGÍA, UASLP-CGEGA-INE/SEMARNAP, MÉXICO (1996).
2. SEMARNAP. LEY GENERAL DE EQUILIBRIO ECOLÓGICO Y PROTECCIÓN AL MEDIO AMBIENTE (1996).
3. TREJO VÁZQUEZ. PROCESAMIENTO DE LA BASURA. EDITORIAL TRILLAS. (1996).
4. PUMA. UNAM. APUNTES DEL CURSO DE IMPACTO AMBIENTAL. (1997) P.27.
5. SEOÁÑEZ C., MARIANO, AUDITORIAS MEDIOAMBIENTALES Y GESTIÓN MEDIOAMBIENTAL DE LA EMPRESA, EDICIONES MUNDI-PRENSA (1995).
6. INE/SEMARNAP. WWW.INE. GOB.MX Y WWW.SEMARNAP.GOB.MX.

TEMA 4. CONTROL DE LA CONTAMINACIÓN DEL AGUA.

1. SANS F., RAMÓN; RIBAS, JOAN DE P., INGENIERÍA AMBIENTAL: CONTAMINACIÓN Y TRATAMIENTOS, MARACOMBO BOIXAREW EDITORES. ESPAÑA. (1989).

TEMA 5. CONTROL DE LA CONTAMINACION DEL AIRE.

1. AVILA GALARZA A., DIFFUSION DES POLLUANTS ATMOSPHÉRIQUES DANS UNE ZONE A TOPOGRAPHIE COMPLEXE. VALIDATION D'UN MODÈLE A L'AIDE MESURES D'AIRPAIF (1996).

**Complementary Books**

2. BUONICORE J. A., DAVIS T.W., AIR POLLUTION ENGINEERING MANUAL, VAN NOSTRAND REINHOLD (1992).
3. NATHANSON, JERRY A., P. E, BASIC ENVIRONMENTAL TECHNOLOGY. WATER SUPPLY, WASTE MANAGEMENT AND POLLUTION CONTROL, PRESENTICE HALL. PP 440 (1997).
4. NOYES, ROBERT, POLLUTION PREVENTION TECHNOLOGY HANDBOOK, NOYES PUBLICATIONS (1993).
5. SANS F., RAMÓN; RIBAS, JOAN DE P., INGENIERÍA AMBIENTAL: CONTAMINACIÓN Y TRATAMIENTOS, MARACOMBO BOIXAREW EDITORES. ESPAÑA. (1989).
6. W. STRAUSS Y S.J.MAINWARING, CONTAMINACIÓN DEL AIRE, EDITORIAL TRILLAS. (1990.)



- TEMA 6. CONTROL DE LA CONTAMINACION PRODUCIDA POR RESIDUOS SÓLIDOS.  
7. NATHANSON, JERRY A., P. E, BASIC ENVIRONMENTAL TECHNOLOGY. WATER SUPPLY, WASTE MANAGEMENT AND POLLUTION CONTROL, PRESENTICE HALL. PP 440 (1997).  
8. SANS F., RAMÓN; RIBAS, JOAN DE P., INGENIERÍA AMBIENTAL: CONTAMINACIÓN Y TRATAMIENTOS, MARACOMBO BOIXAREW EDITORES. ESPAÑA. (1989).  
TEMA 7. CONTROL PARA CONTAMINACIONES ESPECIALES.  
1. SEOÁNEZ C., MARIANO, INGENIERÍA MEDIOAMBIENTAL APLICADA, EDICIONES MUNDI-PRENSA. (1997).  
SEOÁNEZ C., MARIANO, ECOLOGÍA INDUSTRIAL: INGENIERÍA MEDIOAMBIENTAL APLICADA A LA INDUSTRIA Y A LA EMPRESA, EDICIONES MUNDI-PRENSA, (1998).

#### BASIC BIBLIOGRAPHY

- FAIR, GEYER y OKUN, Ingeniería sanitaria y de aguas residuales, Limusa, tomos I y II, 1996.
- I.T.E.S.M., Compendio de normas oficiales en materia ambiental, 1993.
- SANS F. R., RIBAS J. de P., Ingeniería ambiental, contaminación y tratamientos, Productica, 1989.  
SEMARNAP, Ley General de Equilibrio Ecológico y Protección al Ambiente, 1996.  
SEOANEZ C.,M. y Col, Ingeniería del medio ambiente aplicada al medio natural continenta, Editorial Mundipremia, 1996.  
STRAUSS W., MAINWARING S.J., Contaminación del aire, causas efectos y soluciones, Trillas, 1990.
- TREJO V.R., Procesamiento de la basura, Trillas, 1994.

#### COMPLEMENTARY BIBLIOGRAPHY

- ÁVILA G. ALFREDO, Difusión de contaminantes atmosféricos en una zona de topografía compleja. Tesis de Doctorado, Universidad París XII, Francia, 1996.
- BENNET D.P. y HUMPRIES D.A, Introducción a la ecología del campo, 1° De. Blume, Madrid, 1978.  
BUONICURE J., y W.T. DAVI, Air pollution engineering manual, 1996.
- CENTRO DE ESTUDIOS HIDROGRÁFICOS, Funcionamiento de estaciones operadoras de aguas residuales, Tomos I y II, Dirección General de Obras Hidrográficas, Madrid, España. 1975
- GONZÁLEZ J., Ecología, Anuies, México.
- MILLER G. TYLER, Living in the environment, 2° Ed. Wadsworth Publishing Co. Belmont, California, 1979.
- PÁRAMO V. y S. TURPIN, Ecología y paisaje, U.A.M.A., México, 1986.
- PUENTE MUÑIZ C. F., Apuntes de energía y medio ambiente, Ed. Universitaria Potosina, 1988.  
S.S.A., Dirección de Ingeniería Sanitaria, Manual de saneamiento, vivienda, agua y desechos, Limusa, 1993.
- TURK A., J. TURK O. WITTES, R. WITTES, Tratado de ecología, Ed. Interamericana, México, 1987.