

English as a Second Language (ESL) (ESLA)

School of Linguistics and Applied Language Studies
Faculty of Arts and Social Sciences

ESLA 1300 [1.0 credit] (formerly 21.130)
Introductory English as a Second Language for Academic Purposes

Skills and strategies in ESL for students with little or no experience with academic English. General proficiency development. Integrated language skills and strategies for academic success at university.
Prerequisite: Placement by the Canadian Academic English Language Assessment.
Nine hours a week (one term).

ESLA 1500 [1.0 credit] (formerly 21.150)
Intermediate English as a Second Language for Academic Purposes

Skills and strategies in ESL for students with basic grammatical and oral competence but limited experience with academic English. Focus on reading, listening and writing. Introduction to research skills.
Prerequisite: grade of C- or better in ESLA 1300 or placement by the Canadian Academic English Language Assessment.
Six hours a week (one term).

ESLA 1900 [1.0 credit] (formerly 21.190)
Advanced English as a Second Language for Academic Purposes

Development of research and analytic skills, primarily through reading and writing of academically-oriented texts.
Prerequisite: Grade of C or better in ESLA 1500 or placement by the Canadian Academic English Language Assessment.
Six hours a week (one term).

ESLA 1905 [1.0 credit] (formerly 21.195)
Advanced English as a Second Language for Engineering Students

Development of technical communication skills specific to Engineering and Industrial Design: reports, design projects, oral presentations.
Prerequisite: Grade of C or better in ESLA 1500 or placement by the Canadian Academic English Language Assessment.
Three hours a week (two terms).

ESLA 1906 [0.5 credit] (formerly 21.196)
Advanced Writing for English as a Second Language

Strategies for writing academic papers and professional text.
Three hours a week (one term).

Environmental Engineering (ENVE)

Department of Civil and Environmental Engineering
Faculty of Engineering

ENVE 2001 [0.5 credit] (formerly 81.201*)
Process Analysis for Environmental Engineering

Material and energy balances for reacting and non-reacting systems. Applications in mining, metallurgy, pulp and paper, power generation, energy utilization. Emissions to the environment per unit product or service generated. Introduction to life cycle analysis, comparative products and processes.
Prerequisites: CHEM 1000 or CHEM 1101 or equivalent, and MAAE 2400, or approval of the Department.
Lectures two hours a week, problem analysis three hours a week.

ENVE 2002 [0.5 credit] (formerly 81.202*)
Microbiology

The biology of the Bacteria, Archaea, Viruses and Protozoans, from the fundamentals of cell chemistry, molecular biology, structure and function, to their involvement in ecological and industrial processes and human disease. (Also listed as BIOL 2303.)
Precludes additional credit for BIOL 3301.
Prerequisite: BIOL 1003 or CHEM 1000 or CHEM 1101 or equivalent.
Lectures three hours a week.

ENVE 3001 [0.5 credit] (formerly 81.301*)
Environmental Engineering Unit Operations

Dimensional analysis and dimensionless numbers, agitation and mixing of fluids, flow past particles, drag coefficients, settling classification, filtration and other mechanical separations, heat transfer, individual and overall coefficients, mass transfer, individual and overall coefficients, absorption and leaching. Laboratory procedures: settling operations, filtration, aeration, and adsorption.
Prerequisite: MAAE 2300.
Lectures three hours a week, problem analysis one hour a week, laboratory three hours alternate weeks.

ENVE 3002 [0.5 credit] (formerly 81.302*)
Environmental Engineering Systems Modeling

Engineered systems for pollution abatement; chemical reaction engineering; reaction kinetics and rate data analysis; design and modeling of reactors; single and multiple reactions; ideal and nonideal reactors; single and multi-parameter models; biochemical reaction engineering; process control. Laboratory procedures: reactor systems performance: Batch, CSTR and PFR.
Prerequisites: CHEM 1000 or CHEM 1101 or equivalent, MATH 2004, ENVE 2001.
Lectures three hours a week, problem analysis one hour a week, laboratory three hours alternate weeks.

ENVE 3003 [0.5 credit] (formerly 81.303*)
Water Resources Engineering

A quantitative analysis of natural water systems and the development of these systems as a resource. Components of the hydrologic cycle. Quantitative analysis of stream flow. Probability concepts in water resources. Reservoir design and operation. Availability of groundwater. Storm water management.
Prerequisites: CIVE 3208 (concurrent) and MAAE 2300, or permission of the Department.
Lectures three hours a week, problem analysis one hour a week.

ENVE 3004 [0.5 credit] (formerly 81.304*)
Contaminant and Pollutant Transport in the Environment

Physical phenomenon governing the transport of contaminants in the environment: diffusion, advection, dispersion, sorption, interphase transfer. Derivation and application of transport equations in air, surface and

groundwater pollution; analytical and numerical solutions. Equilibrium partitioning of contaminants among air, water, sediment, and biota.

Prerequisites: CHEM 2800, ENVE 3002.

Lectures three hours a week, problem analysis one hour a week.

ENVE 4002 [0.5 credit] (formerly 81.402*)

Environmental Geotechnical Engineering

Landfill design; hydrogeologic principles, water budget, landfill liners, geosynthetics, landfill covers, quality control/quality assurance, clay leachate interaction, composite liner design and leak detection. Landfill operation, maintenance and monitoring. Case studies of landfill design and performance. Geotechnical design of environmental control and containment systems.

Prerequisites: ENVE 3004, CIVE 3208.

Lectures three hours a week, problem analysis one hour a week.

ENVE 4003 [0.5 credit] (formerly 81.403*)

Air Pollution and Emissions Control

Sources and classification of air pollutants. Ambient air quality objectives and monitoring. Stoichiometric, thermodynamic, kinetic considerations in combustion. Particulates. Control and measurement of emissions from mobile and stationary sources. Indoor air quality. Laboratory procedures: emissions from boilers and IC engines, particulate size distribution and control.

Prerequisites: CHEM 2800, MAAE 2300, MAAE 2400.

Lectures three hours a week, problem analysis one hour a week, laboratory three hours alternate weeks.

ENVE 4005 [0.5 credit] (formerly 81.405*)

Environmental Engineering Unit Processes

Chemical treatment methods, biological waste water treatment, and sludge management. Removal of trace organics/hazardous substances. Nutrient removal. Laboratory procedures: Activated sludge, anaerobic growth, chemical precipitation, chlorination.

Prerequisites: ENVE 2002, ENVE 3001, ENVE 3002.

Lectures three hours a week, problem analysis one hour a week, laboratory three hours alternate weeks.

ENVE 4006 [0.5 credit] (formerly 81.406*)

Hydrogeology and Groundwater Flow

Theory of flow through porous media. Site investigation: geology, hydrology and chemistry. Contaminant transport. Unsaturated and multiphase flow. Numerical modeling. Site remediation and remediation technologies.

Prerequisites: ENVE 3004 and CIVE 3208.

Lectures three hours a week, problem analysis three hours alternate weeks.

ENVE 4101 [0.5 credit] (formerly 81.411*)

Waste Management

A systematic analysis of issues dealing with solid and hazardous waste management. Waste definitions and description, collection and transportation, prevention and diversion, treatment technologies, landfilling, thermal processes.

Precludes additional credit for ENVE 4001 and ENVE 4007.

Prerequisites: ENVE 3001, ENVE 3002 and ENVE 3004.

Lectures three hours a week, problem analysis one hour a week.

ENVE 4104 [0.5 credit] (formerly 81.414*)

Environmental Planning and Impact Assessment

Environmental planning and management of residuals. Environmental standards and marketable rights. Risk Assessment, policy development and decision-making. Fault-tree analysis. Canada and U.S environmental regulations. Framework for Environmental Impact Assessment, survey of techniques for impact assessment and EIA review process. Case studies of selected engineering projects.

Precludes additional credit for ENVE 4004 and ENVE 4008.

Prerequisite: ENVE 3002 and ENVE 3004.

Lectures three hours a week, problem analysis three hours alternate weeks.

ENVE 4907 [1.0 credit] (formerly 81.497)

Engineering Project

A major project in engineering analysis, design, development or research carried out by individual students or small teams. The objective is to provide an opportunity to develop initiative, self-reliance, creative ability and engineering judgment. A project proposal, an interim report, an oral presentation, and a comprehensive final report are required.

ENVE 4908 [0.5 credit] (formerly 81.498*)

Design Project

Teams of students develop professional level experience through a design project that incorporates fundamentals acquired in previous mathematics, science, engineering, and complementary studies courses. A final report and oral presentations are required.

Prerequisite: fourth-year registration.

Lectures one hour a week, problem analysis seven hours a week.