



## **DOCTOR IN SUSTAINABLE DEVELOPMENT STUDIES (DISDS)**

### **Rationale**

The unprecedented advances in science and technology have raised continuing challenges that need to be addressed in the academe.

The past and the present strategies of industrialization led to an unacceptable damage to the biophysical environment and affected social inequalities both within the developed communities and the non-industrialized world. Global warming, climate change, resource depletion, wastefulness and pollution generation are some of the challenges faced by societies. There is a need to formulate solutions and new strategies to deal with these issues employing appropriate tools to address poverty, health and other societal and environment-related issues. Likewise, it is imperative to understand the scientific issues behind climate, hydrology, disease, ecology, biodiversity, soil science, infrastructure engineering and toxicology, in order to implement government policies, business strategies, technologies and proper attitude to be imbibed and options have to be undertaken to attain economic progress, ecological protection and social justice towards greater sustainability.

Iligan Institute of Technology, the CHED CENTER OF EXCELLENCE IN SCIENCE AND TECHNOLOGY, has been mandated to contribute to the development of the MINSUPALA Region. The concern of IIT is for the entire region of Mindanao, Sulu and Palawan to develop solutions to multi-faceted environment-related problems. The realities in the socio-cultural, political and economic environment prompted MSU-IIT and DENR-MGB to develop a graduate program in Sustainable Development Studies that is geared towards sustainability of community based resources and its utilization by the present and the future generations.

The graduate program in Sustainable Development Studies is ladderized type, especially designed to attract people in the government and private sectors who deal with the utilization of the country's natural resources. The graduate diploma (Graduate Diploma in Sustainable Development Studies) requiring 18 units only can be completed in one year. An additional of 17-20 units is required for the master's degree (Master in Development Studies) which needs another year. To proceed to the doctoral program (Doctor in Sustainable Development Studies), an additional of 24-26 units must be taken for another year. Students spend one year for graduate diploma, two years for masters and three years for doctoral degrees. Almost all courses/subjects include 25% classroom-based activities and 75% research or activities which are field-based. In the three options, students learn how to become more effective in conceptualizing, planning, and implementing sustainable development programs through better understanding of the issues, enhanced technical skills and improved awareness of the commercial and management techniques in delivering more sustainable practices in their socio-cultural, political and economic milieu.

### **Objectives**

The program aims:

1. To produce professional experts on sustainable development with the understanding and skills necessary to conceive and deliver fitting solutions to society's needs and to address local challenges within a sustainability framework;
2. To explore value frameworks which are based on the concepts of sustainable development that can guide the design and management of environmentally critical projects so that their impacts are addressed at every stage of planning, implementation, evaluation and monitoring;
3. To develop a strong socio-eco-political awareness among graduates and to foster an understanding of the foundations of management theory in the areas of strategy, organization, social marketing and environmental economics, the connections between technology and management, and the introduction of change within organizations; and
4. To encourage and stimulate an appreciation of trade offs and conflicts inherent in decision making and the need to seek wider and alternative solutions to technical problems so that graduates of the course can engage in strategic and critical thinking during their employment within industry, business or government.

## Admission Requirements

### Academic backgrounds:

1. Any baccalaureate degree from recognized institution of higher learning with a grade point average (GPA) of 2.0 or better;
2. A background, formal or informal on governments or non-government organizational operations, on industrial establishments, or any organization related to or having to do with the environment and its resources;
3. Any master's degree from a recognized institution of higher learning with a GPA of 2.0 or better can proceed to doctoral degree provided the total number of units to be taken will include a balanced combination of the core and the major and/or elective or cognate courses;

### Formal:

The student shall submit the following upon application for admission:

1. Duly accomplished application form
2. Curriculum vitae
3. The original and one duplicate copy of the undergraduate and graduate official transcript of records;
4. Duly accomplished recommendations forms from two former professors or immediate supervisors attesting to students intellectual capacity to undertake advanced studies;
5. Payment of application fees (non-refundable)
6. Certification of English Proficiency (Test of English as Foreign Language, TOEFL average score of 500), for foreign students whose native language and medium are not English;
7. Other requirements of the School of Graduate Studies, such as health clearance, student accident insurance, and other special admission requirements that may be imposed by the Graduate School

All completed applications shall be processed in the School of Graduate Studies, and evaluated by the Graduate Program Coordinator and endorses the same to the Dean of the Graduate Studies.

## Degree Requirements

The Doctor in Sustainable Development Studies (DiSDS) as a ladderized or progressive program, requires 18 units only for the graduate diploma and can be completed in one year; an additional of 17-20 units is required for master's degree which need another year; and an additional of 26 units must be taken for another year, by doctoral students. Students will spend one year for diploma, two years for masteral, and three years for doctoral degrees.

To qualify for the doctoral degree, the following conditions need to be satisfied:

1. Completion of an approved Program of Study;
2. Maintenance of a Cumulative Weighted Average Grade of not lower than 1.75 for the duration of the study;
3. Passing of the Preliminary Examination that should be taken after completing the core courses of not less than 12 units for those taking the degree under the ladderized program;
4. Passing the Comprehensive Examination after completing at least fourteen (14) units of major courses, for all students whether under the ladderized or lateral programs;
5. Completion of graduate seminar and yearly presentation of dissertation in progress in College Research Colloquia;
6. Submission of a paper based on the dissertation which is published in a reputable refereed journal;
7. Completion and successful public defense of a doctoral dissertation; and
8. Submission of at least eight bound certified copies of the approved dissertation.

Students with Masteral degrees in any field of specialization can be admitted to the degree program in Doctor in Sustainable Development Studies (DiSDS) after passing the preliminary exam given after one semester of coursework equivalent to, but not less than 10 units of core courses, and will be required to take a total of 44 units, distributed as follows:

(1) Core courses	11 units
(2) Major courses	14 units
(3) Cognate courses	7 units
(4) Doctoral dissertation	12 units
<b>Total</b>	<b>44 units</b>

The core courses must include the following:

SDS 201	Foundation of Sustainable Development	3 units
EnSci 206	Environmental Impact Assessment	4 units
	<b>Total</b>	----- <b>7 units</b>

and at least four (4) units of any of the following core courses:

SDS 202	Socio-economic and Political Dimensions of SD	2 units
SDS 203	Resource Management and Accounting	2 units
SDS 204	Environmental Laws, Policies and Ethics	2 units
SDS 205	Administration of SD Programs	2 units
SDS 206	Principles of Modeling and Simulation	3 units

Professionals with Doctoral or Ph.D. degrees in other fields of other specialization can be awarded a Post-doctoral Certificate in Sustainable Development Studies (*PdCiSDS*) upon fulfillment of the following:

1. At least 2 years of extensive research as a Project Leader of a *high impact* Sustainable Development Project implemented and administered to any community in collaboration with a senior faculty of the SDS Graduate Program;
2. Publication of at least 2 articles in a reputable refereed ISI journals

# DOCTOR IN SUSTAINABLE DEVELOPMENT STUDIES (DiSDS)

(LIST OF COURES BY SEMESTER)

(LADDERIZED)

## First Year, First Semester

Course No.	Course Title	Units	Hrs./Wk			Corequisite(s)
			Lec	Fieldwork	Total	
SDS 201	Foundation of Sustainable Development	3	2	3	5	None
SDS 202	Socioeconomic and Political Dimensions of Sustainable Development	2	1	3	4	None
SDS 203	Resource Management and Accounting	2	1	3	4	None
SDS 204	Environmental Laws, Policies and Ethics	2	1	3	4	None
SDS 205	Administration of Sustainable Development Programs	2	1	3	4	SDS 201
SDS 296A	Seminar	1	1	0	1	SDS 201
Total		12	7	15	22	

## First Year, Second Semester\*

Course No.	Course Title	Units	Hrs./Wk			Prerequisite(s)
			Lec	Fieldwork	Total	
EnSci 206	Environmental Impact Assessment	4	1	9	10	None
SDS 207	Policy Formulation, Theories and Intervention	2	1	3	4	SDS 201
SDS 295	Independent Studies	2	1	3	4	SDS 201
SDS 298	Environmental Research Methods	3	2	3	5	SDS 201
SDS 296B	Seminar B	1	1	0	1	SDS 296A
Total		12	6	18	24	

\*Preliminary examination may be taken anytime during this semester.

## Second Year, First Semester

Course No.	Course Title	Units	Hrs./Wk			Prerequisite(s)
			Lec	Fieldwork	Total	
SDS 206	Prin. Of Modeling and Simulation	3	2	3	5	SDS 201
Major 1		2	1	3	4	SDS 201
Major 2		2	1	3	4	SDS 201
Major 3		2	1	3	4	SDS 201
Major 4		2	1	3	4	SDS 201
Major 5		2	1	3	4	SDS 201
Total		13	7	18	25	

**Second Year, Second Semester\*\***

Course No.	Course Title	Units	Hrs./Wk			Prerequisite(s)
			Lec	Fieldwork	Total	
Major 6		2	1	3	4	SDS 201
Major 7		2	1	3	4	SDS 201
Major 8		2	1	3	4	SDS 201
Major 9		2	1	3	4	SDS 201
Major 10		2	1	3	4	SDS 201
Major 11		2	1	3	4	SDS 201
	Total	12	6	18	24	

\*\* Comprehensive Examination may be taken after completing this semester of course work.

**Third Year, First Semester**

Course No.	Course Title	Units	Hrs./Wk			Prerequisite(s)
			Lec	Fieldwork	Total	
SDS 400	Doctoral Dissertation	6	0	18	18	Completed all academic requirements.
	Total	6	0	18	18	

**Third Year, Second Semester\*\*\***

Course No.	Course Title	Units	Hrs./Wk			Prerequisite(s)
			Lec	Fieldwork	Total	
SDS 400	Doctoral Dissertation	6	0	18	18	
	Total	6	0	18	18	

\*\*\* In case the student failed to present his/her dissertation output during this semester, he/she must enroll in SDS 400 for residence during the semester that he/she intends to present his dissertation.

**DOCTOR IN SUSTAINABLE DEVELOPMENT STUDIES (DiSDS)  
(LIST OF COURSES BY SEMESTER)**

**(LATERAL ENTRY to the Doctoral Program)**

**First Year, First Semester**

Course No.	Course Title	Units	Hrs./Wk			Corequisite(s)
			Lec	Fieldwork	Total	
SDS 201	Foundations of Sustainable Development	3	2	3	5	None
EnSci 206	Environmental Impact Assessment	4	1	9	10	None
Core		2	1	3	4	None
Core		2	1	3	4	None
SDS 296A	Seminar A	1	1	0	1	SDS 201
	Total	12	6	18	24	

**First Year, Second Semester\***

Course No.	Course Title	Units	Hrs./Wk			Prerequisite(s)
			Lec	Fieldwork	Total	
SDS 298	Environmental Research Methods	3	2	3	5	SDS 201
Major 1		2	1	3	4	SDS 201
SDS 295	Independent Studies	2	1	3	4	SDS 201
Major 2		2	1	3	4	SDS 201
SDS 296B	Seminar B	1	1	0	1	SDS 296A
	Total	10	6	12	18	

\* Preliminary Examination may be taken anytime during this semester to show competency for the Doctoral Program.

**Second Year, First Semester**

Course No.	Course Title	Units	Hrs./Wk			Prerequisite(s)
			Lec	Fieldwork	Total	
Major 3		2	1	3	4	SDS 201
Major 4		2	1	3	4	SDS 201
Major 5		2	1	3	4	SDS 201
Major 6		2	1	3	4	SDS 201
Major 7		2	1	3	4	SDS 201
	Total	10	5	15	20	

**Second Year, Second Semester\*\***

Course No.	Course Title	Units	Hrs./Wk			Prerequisite(s)
			Lec	Fieldwork	Total	
SDS 400	Dissertation	6	0	18	18	Completed all academic requirements.
	Total	6	0	18	18	

\*\* DOCTORAL COMPREHENSIVE EXAMINATION must be taken in MAY of this Academic Year

**Third Year, First Semester**

Course No.	Course Title	Units	Hrs./Wk			Prerequisite(s)
			Lec	Fieldwork	Total	
SDS 400	Dissertation	6	0	18	18	
	Total	6	0	18	18	

### Third Year, Second Semester\*\*\*

\*\*\*Student must enroll in SDS 400 for RESIDENCE if he/she intends to present his/her DOCTORAL DISSERTATION..

### Summary of Courses and Units

#### Proposed Curricula for Graduate Program in Sustainable Development Studies

GD = Graduate Diploma;  
 MiSDS = Master in Sustainable Development Studies;  
 DiSDS = Doctor in Sustainable Development Studies

Courses	Number Of Units Required			
	GD	MiSDS	LD DiSDS	LT
<b>A. Core Courses</b>	15	4	0	11
<b>B. Major Courses</b>	0	9	14	14
(based on chosen area of concentration)				
<b>C. Cognates</b>	3	7	12	19
SDS 295 – Independent Study	2	0	0	2
SDS 296A – Seminar A	1	0	0	1
SDS 296B – Seminar B	0	1	0	1
SDS 298 – Environmental Research Method	0	3	0	3
SDS 299 – Special Project	0	3	0	0
SDS 400 – Doctoral Dissertation	0	0	12	12
<b>Total number of units</b>	<b>18</b>	<b>38</b>	<b>61-64</b>	<b>44</b>
			Legend: LD ladderized program direct Doctoral LT lateral entry to the Doctoral program	
<b>A. Core Courses (Number/Description)</b>	<b>Credit Units</b>	<b>Lec</b>	<b>Fieldwork*</b>	
SDS 201 (Foundation of SD)	3	2	1	
SDS 202 (Socioeconomic and Political Dimension of SD)	2	1	1	
SDS 203 (Resource Management and Accounting)	2	1	1	
SDS 204 (Environmental Laws, Policies and Ethics)	2	1	1	
SDS 205 (Administration of Sustainable Development Programs)	2	1	1	
SDS 206 (Principles of Modeling and Simulation)	3	2	1 (Lab)	
SDS 207 (Policy Formulation, Theories and Interventions)	2	1	1	
EnSci 206 (Environmental Impact Assessment)	4	1	1	

Courses	Number Of Units Required		
*Fieldwork can be any of the following activities as prescribed by the instructor in the syllabus and implied in the course description. A written report of such activity which will include the student's interpretation and analysis of data and perception is required as partial fulfillment of the course: a. reconnaissance survey b. primary/secondary data collection c. field observation d. immersion in the community			
<b>SIX (6) Areas of Concentrations</b> 1. Sustainable Resource Management 2. Sustainable Community Development 3. Sustainable Economic Development 4. Sustainable Rural and Urban Planning 5. Sustainable Environmental Education 6. Sustainable Environmental Engineering.	SRM SCD SED SRUP SEE SEEng'g		

<b>Summary of Core Courses for the ladderized program (LD) and lateral (LT) entry to the program: DiSDS</b>		<i>DiSDS</i>	
		Units	
<b>Core Courses</b>	<b>LD (ladderized)</b>		<b>LT (lateral entry)</b>
SDS 201 (Foundations of SD)	Required	3	required
SDS 202 (Socioeconomic and Political Dimensions of SD)	Required	2	optional
SDS 203 (Resource Management and Acctg.)	Required	2	optional
SDS 204 (Environmental Laws, Policies, and Ethics)	required	2	optional
SDS 205 (Administration of Sustainable Development Programs)	required	2	optional
SDS 206 (Principles of Modeling and Simulation)	optional	3	optional
SDS 207 (Policy Formulation, Theories and Interventions)	optional	2	optional
EnSci 206 (Environmental Impact Assessment)	required	4	required
	Required = 15 units		Required = 7 units
<b>Areas of concentration:</b>			
<b>1. Sustainable Resource Management (SRM)</b>	Credits Units	Lec	Fieldwork*/ELP
SDS 241 (Environmental Geology)	2	1	1
SDS 242 (Environmental Chemistry)	2	1	1
SDS 243 (Health and Environmental Toxicology)			

<b>Courses</b>	<b>Number Of Units Required</b>		
SDS 244 (Forest Resources Management)	2	1	1
SDS 245 (Water Resources Management)	2	1	1
SDS 246 ( Land Resources Management)	2	1	1
SDS 247 (Assessment of Alternative Energy Resources)	2	1	1
SDS 248 (Aquatic Ecological and Resources Management)	2	1	1
SDS 249 (Integrated Energy Management)	2	1	1
SDS 250 (Energy Systems Design)	2	1	1
SDS 255 (Indigenous Knowledge Management)	2	1	1
SDS 261 (Technologies for Sustainable Development)	2	1	1
<b>2. Sustainable Community Development (SCD)</b>	<b>Credit Units</b>	<b>Lec</b>	<b>Fieldwork</b>
SDS 251 (Rural and Urban Development)	2	1	1
SDS 252 (Community Organizing)	2	1	1
SDS 253 (Peace & Conflict Management)	2	1	1
SDS 254 (Gender and Development)	2	1	1
SDS 255 (Indigenous Knowledge Management)	2	1	1
SDS 256 (Society, Science & Technology)	2	1	1
SDS 257 (Social Change and Development)	2	1	1
SDS 258 (Human Ecology)	2	1	1
SDS 259 (Population Growth)	2	1	1
SDS 261 (Technologies for Sustainable Development)	2	1	1
SDS 265 (Farming system Design for Sustainability)	2	1	1
SDS 268 (Environment – friendly Economics)	2	1	1
<b>3. Sustainable Economic Development (SED)</b>	<b>Credit Units</b>	<b>Lec</b>	<b>Fieldwork</b>
SDS 261 (Technologies for Sustainable Development)	2	1	1
SDS 262 (Economy and Ecotourism Development)	2	1	1
SDS 263 (Community-based Entrepreneurial Development)	2	1	1
SDS 264 (Population, Consumption and Consumerism)	2	1	1
SDS 265 (Farming System Design for Sustainability)	2	1	1
SDS 268 (Environment-friendly Economics)	2	1	1
SDS 269 (Integrated Waste Management)	2	1	1
SDS 249 (Integrated Energy Management)	2	1	1
SDS 251 (Rural and Urban Development)	2	1	1

<b>Courses</b>	<b>Number Of Units Required</b>		
SDS 253 (Peace and Conflict Management)	2	1	1
SDS 255 (Indigenous Knowledge Management)	2	1	1
SDS 258 (Human Ecology)	2	1	1
<b>4. Sustainable Rural &amp; Urban Planning (SRUP)</b>			
SDS 271 (Planning and the Development Process)	2	1	1
SDS 272 (Planning Law and Practice)	2	1	1
SDS 273 (Strategies in Rural and Urban Planning)	2	1	1
SDS 274 (Utilities Management)	2	1	1
SDS 275 (Development Communication)	2	1	1
SDS 276 (Hazard Management)	2	1	1
SDS 277 (Planning, Environment and Sustainability)	2	1	1
SDS 245 (Water Resource Management)	2	1	1
SDS 246 (Land Resources Management)	2	1	1
SDS 251 (Rural and Urban Development)	2	1	1
SDS 258 (Human Ecology)	2	1	1
SDS 262 (Economy and Ecotourism Development)	2	1	1
SDS 263 (Community-based Entrepreneurial Development)	2	1	1
SDS 264 (Population, Consumption and Consumerism)	2	1	1
SDS 265 (Farming Systems Design for Sustainability)	2	1	1
SDS 269 (Integrated Waste Management)	2	1	1
<b>5. Sustainable Environmental Education (SEE)</b>	<b>Credit Units</b>	<b>Lec</b>	<b>Fieldwork</b>
SDS 281 (Education for Sustainable Development)	2	1	1
SDS 282 (Environment Awareness & Sustainability in Schools & Communities)	2	1	1
SDS 283 (Information, Education and Communication for SD)	2	1	1
SDS 284 (Information and Communication Technologies for SD.	2	1	1
SDS 248 (Aquatic Ecological Resources Management)	2	1	1
SDS 253 (Peace and Conflict Management)	2	1	1
SDS 254 (Gender and Development)	2	1	1
SDS 255 (Indigenous Knowledge Management)	2	1	1
SDS 256 (Science, Technology and Society)	2	1	1
SDS 261 (Technologies for Sustainable Development)	2	1	1
<b>Courses</b>	<b>Number Of Units Required</b>		
SDS 263 (Community – based Entrepreneurial Development)	2	1	1
SDS 264 (Population, Consumption, and Consumerism)	2	1	1
SDS269 (Integrated Waste Management)	2	1	1
<b>6. Sustainable Environmental Engineering (SEEng'g)</b>	<b>Credit Units</b>	<b>Lec</b>	<b>Fieldwork</b>
SDS 241 (Environmental Geology)	2	1	1
SDS 242 (Environmental Chemistry)	2	1	1
SDS 243 (Health and Environmental Toxicology)	2	1	1
SDS 245 (Water Resources Management)	2	1	1
SDS 246 (Land Resources Management)	2	1	1
SDS 247 (Assessment of Alternative Energy Resources)	2	1	1
SDS 249 (Integrated Energy Management)	2	1	1
SDS 250 (Energy Systems Design)	2	1	1
SDS 261 (Technologies for Sustainable Development)	2	1	1
SDS 265 (Farming System and Design for Sustainability)	2	1	1
SDS 269 (Integrated Waste Management)	2	1	1
SDS 271 (Planning and the Development Process)	2	1	1
SDS 273 (Strategies in Rural and Urban Planning)	2	1	1
SDS 274 (Utilities Management)	2	1	1
SDS 276 (Hazard Management)	2	1	1
SDS 277 (Planning, Environment and Sustainability)	2	1	1
SDS 301 (Introduction to Sustainability Engineering)	2	1	1
SDS 310 (Environmental Life Cycle Assessment and Green Design)	2	1	1
SDS 320 (Advanced Topics in the Air Pollution)	2	1	1
SDS 330 (Water Quality Engineering)	2	1	1

SDS 340 (Sustainable Processing of Engineering Materials)	2	1	1
SDS 350 (Industrial Audit)	2	1	1
SDS 390 (Special Topics in Sustainable Environmental Engineering)	2	1	1
SDS 391 (Special Problem in Sustainable Environmental Engineering)	2	1	1

<b>D. Units Per Semester for Fulltime Student Admitted with Baccalaureate Degree and Intends to the Doctoral Degree.</b>	Ladderized (Direct Doctoral Program)	Lateral entry to the Doctoral Program
First Year		
First Semester	12	12
Second Semester	12	10
Summer	0	0
Second Year		
First Semester	13	10
Second Semester	12	6
Summer	0	0
Third Year		
First Semester	6	6
Second Semester	6	(6) Residency
<b>Grand Total</b>	<b>61</b>	<b>44</b>

# CATALOGUE OF COURSES

## CORE COURSES

### SDS 201 FOUNDATIONS OF SUSTAINABLE DEVELOPMENT

Provides an overview of the subject on the sustainable development as it applies to local, national, and global environments. This includes the principles of ecology and environmental science as a background.

Credit : 3 units (2 units lecture, 1 unit fieldwork)

Prerequisite(s) : None

### SDS 202 SOCIOECONOMIC AND POLITICAL DIMENSIONS OF SUSTAINABLE DEVELOPMENT

Deals with socio-cultural, economic and political theories and models on Human-Environment interactions; eco-governance in the Philippines and other related issues.

Credit : 2 units (1 unit lecture, 1 unit fieldwork)

Prerequisite(s) : None

### SDS 203 RESOURCE MANAGEMENT AND ACCOUNTING

Explains the concepts, methods and tools in the management of a resource; deals with the underlying ethical and scientific principles in resource management within the framework of sustainable development, environmental resource supply and allocation.

Credit : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : None

### SDS 204 ENVIRONMENTAL LAWS, POLICIES AND ETHICS

Environmental laws and policies in research and development in support to environmental management, planning and community advocacy. Institutional framework / organizations involved with environmental issues.

Credit : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : None

### SDS 205 ADMINISTRATION OF SUSTAINABLE DEVELOPMENT PROGRAMS

Explores techniques in planning, implementation and monitoring of SD programs case studies and discussions on implemented SD programs.

Credit : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 201

### SDS 206 PRINCIPLES OF MODELING AND SIMULATION

Focuses on information and systems with emphasis on areas such as modeling and simulation, introduction to geographic information systems and techniques for decision making.

Credit : 2 units (1 lecture, 2 units laboratory)

Prerequisite(s) : SDS 201

SDS 207            POLICY FORMULATION, POLICIES AND INTERVENTIONS

Analysis of existing policies on SD, Philippine Agenda, and develop an understanding on how local and national policies are formulated and implemented. Students will be exposed to some intervention techniques to equip them with skills to become effective agents of change for SD.

Credit                : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s)    : SDS 201

ENSCI 206           ENVIRONMENTAL IMPACT ASSESSMENT

Framework and methodology for environmental impact assessment; prediction and assessment of impacts on the physical and biological environment, assessment of environmental resources in terms of their potential utilization and corresponding impact to human activities.

Credit                : 4 units (1 lecture, 3 units fieldwork)  
Prerequisite(s)    : SDS 201

**COGNATES: (REQUIRED COURSES)**

SDS 295            INDEPENDENT STUDY

An independent research project in a specific area of study under the guidance of a panel of multidisciplinary faculty members.

Credit                : 2 units  
Prerequisite(s)    : SDS 201

SDS 296A           SEMINAR A

Organize a seminar by inviting resource speakers of a topic / theme.

Credit                : 1 unit  
Co-requisite(s)    : SDS 201

SDS 296B           SEMINAR B

Delivery of a topic of choice based on the theme of the class or topic conducted under his Independent Studies.

Credit                : 1 unit  
Prerequisite(s)    : SDS 296A

SDS 298            ENVIRONMENTAL RESEARCH METHODS

Deals with the appreciation of research in the context of environmental problems / issues as well as comparing various physical, biological, social and statistical research methods for environmental analysis and management.

Credit                : 3 units (2 units lecture, 1 unit laboratory or fieldwork)  
Prerequisite(s)    : SDS 201

SDS 299            SPECIAL PROJECT

Research and development for knowledge and application undertaken by master's students such as a contribution and fulfillment of the requirements of the degree.

Credit                : 3 units  
Prerequisite(s)    : Core courses completed

SDS 400 DOCTORAL DISSERTATION

Research and development for knowledge and application undertaken by doctoral students as a contribution and fulfillment of the requirements of the degree.

Credit : 12 units  
Prerequisite(s) : All academic courses completed

**AREA OF CONCENTRATION:  
Sustainable Resource Management (SRM)**

SDS 241 ENVIRONMENTAL GEOLOGY

Geologic processes, hazards and human activities that change geological environment.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 242 ENVIRONMENTAL CHEMISTRY

Study of a major chemical cycles involved in environmental processes and chemical elements affecting life within ecosystem. Factors controlling these chemical cycles, interaction of atmosphere, water solid surfaces and life involved in chemical cycles.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 243 HEALTH AND ENVIRONMENTAL TOXICOLOGY

Hazardous waste management, classification and major characteristics of major groups of pollutants, controversy and concern about synthetic organic compounds, understanding dose-response and its relationship to LD50 and ED50, ecological gradients and tolerances. Process of biomagnification and its importance in toxicology. Threshold effects of environmental toxins and how they can be controlled in the environment. Risk assessment in toxicology.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 244 FOREST RESOURCES MANAGEMENT

Basic principles in the of forest management, including its historical context, conserving existing forests, roles of parks in the conservation of wilderness, representative natural areas, and wildlife habitants for outdoor recreation and scientific research. Includes deforestation, reforestation programs, and certification of forest practices, forest management.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 245 WATER RESOURCE MANAGEMENT

Overview of water resources planning and management, including the basic principles of hydrology and hydrogeology; the social, economic and policy framework for water resources management; application of environmental criteria for water supply projects; regional water supply planning issues ; emerging technical and policy issues related to national, state and local water resources management.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 246 LAND RESOURCES MANAGEMENT

Review of ecosystems and modifiers in the system (climate, water, nutrients, etc), fundamentals of natural resource response that contribute to the successful land management. How to read and understand the land which includes the classification, suitability, productivity including mineral resources management. An interface between managers and mineral resources, focusing on a selection of practical topics related to minerals and mining. Role of mining activities in the development process, global, national, and provincial distribution of resources; policy issues relating to environmental, economic and political consequences of nonrenewable resource exploitation.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 247 ASSESSMENT OF ALTERNATIVE ENERGY RESOURCES

Alternatives to fossil fuels, geothermal, solar, waterpower, wind, tidal energy and others. Basic tools used to analyze and assess alternative energy and environmental futures, specific issues regarding resource scarcity – availability, energy quality, new technologies and technological change, conventional / renewable /perpetual / alternative energy sources and sustainable energy development.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 248 AQUATIC ECOLOGICAL AND RESOURCES MANAGEMENT

Human exploitation of foreshore and onshore minerals deposits including the continental and deep ocean floor deposits submarine waste dumping, marine, fresh and brackish water resources on tropical coast and the objectives and techniques of management, analysis and modeling of resource use and knowledge of techniques for promoting sustainable harvesting of resources, resource management failures of the past, tropical coastal aquaculture, its environmental impacts, and interaction between capture and culture fisheries.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 249 INTEGRATED ENERGY MANAGEMENT

Global energy issues, objective, strategies, policies, and the environmental impacts of alternative energy sources, energy issues. Objectives, strategies, and policies, assess alternatives, appreciation of policy strategies and instruments and formulate an energy policy for a region.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 250 ENERGY SYSTEM DESIGN

Introduction to design of energy systems by synthetic and/or experimental procedures. Technical and economic feasibility study to be established.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 255 INDIGENOUS KNOWLEDGE MANAGEMENT

Identification and rational utilization of indigenous knowledge system for environmental conservation and community development.

Credit : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 201

**SDS 261            TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT**

Technological applications considering economic development that enhances and protect the natural resource quantities and qualities.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)     : SDS 201

**AREA OF CONCENTRATION:  
Sustainable Community Development (SCD)**

**SDS 251            RURAL AND URBAN DEVELOPMENT**

Studies rural and urban areas, their nature, structure/ function, and change / problems and relate them sustainable development issues.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)     : SDS 201

**SDS 252            COMMUNITY ORGANIZING**

Deals with community organizing as a process and method of improving community life through people empowerment.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)     : SDS 201

**SDS 253            PEACE AND CONFLICT MANAGEMENT**

Offers fundamental concepts and principles in understanding peace and conflict – related issues. It explores basic approaches in conflict resolution and management in both traditional and modern settings. It also relates the issue to the building of a culture of peace towards sustainable development.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)     : SDS 201

**SDS 254            GENDER AND DEVELOPMENT**

Analysis of sex/gender differentiation; theories of gender inequality, and analysis of the ways women and men effect, and are affected by environment.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)     : SDS 201

**SDS 255            INDIGENOUS KNOWLEDGE MANAGEMENT**

Identification and rational utilization of indigenous knowledge system for environmental conservation and community development:

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)     : SDS 201

SDS 256            SOCIETY, SCIENCE AND TECHNOLOGY

An analysis of the interrelationship between science, technology, culture and society.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 257            SOCIAL CHANGE AND DEVELOPMENT

Theories of social change and empirical studies of determinant and consequences of change. Experiences of underdeveloped and develop countries will be examined.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 258            HUMAN ECOLOGY

Models of human adaptation to various environmental and socio-cultural settings, and patterned responses to changes in these setting as a result of technological advances and urbanization.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 259            POPULATION GROWTH

Deals with population impacts to resource depletion and degradation.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 261            TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT

Technological applications considering economic that enhances and protect the natural resource quantities and qualities.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 265            FARMING SYSTEMS DESIGN FOR SUSTAINABILITY

Principles and strategies for designing sustainable farming systems or agricultural production characterized by social, political, and economic conditions in the context of global environment.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 268            ENVIRONMENT-FRIENDLY ECONOMICS

Innovative economics that promote environment-friendly and highly efficient utilization of resources to ensure sustainable growth and development.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

**AREA OF CONCENTRATION:  
Sustainable Economic Development (SED)**

**SDS 261            TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT**

Technological applications considering economic that enhances and protect the natural resource quantities and qualities.

Credit                 : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)     : SDS 201

**SDS 262            ECONOMY AND ECOTOURISM DEVELOPMENT**

Designs, monitor, evaluate, and improve ecotourism as a tool for poverty alleviations and biodiversity conservation through sustainable practices and principles.

Credit                 : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)     : SDS 201

**SDS 263            COMMUNITY-BASED ENTREPRENEURIAL DEVELOPMENT**

Farm and non-farm small businesses grounded on the foundation of shared understanding about public entrepreneurship where leadership training, community driven planning and applied research and entrepreneurial support organizations are key to its sustenance.

Credit                 : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)     : SDS 201

**SDS 264            POPULATION, CONSUMPTION AND CONSUMERISM**

Household consumption patterns affecting the environment, the changes of consumer habits that cause damage or would benefit the environment and whose data base with input-output models is used to calculate impacts of different kind of consumer expenditure.

Credit                 : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)     : SDS 201

**SDS 268            ENVIRONMENT-FRIENDLY ECONOMICS**

Innovative economics that promote environment-friendly and highly efficient utilization of resources to ensure sustainable growth and development.

Credit                 : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)     : SDS 201

**SDS 269            INTEGRATED WASTE MANAGEMENT**

System assessment for wastes collection and recovery and institutional linkages disposal strategies in private – public partnership.

Credit                 : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)     : SDS 201

**SDS 249            INTEGRATED ENERGY MANAGEMENT**

Global energy issues, objective, strategies, policies, and the environmental impacts of alternative energy sources, energy issues. Objectives, strategies, and policies, assess alternatives, appreciation of policy strategies and instruments and formulate an energy policy for a region.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 251 RURAL AND URBAN DEVELOPMENT

Studies rural and urban areas, their nature, structure/ function, and change / problems and relate them sustainable development issues.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

**AREA OF CONCENTRATION:  
Sustainable Rural and Urban Planning (SRUP)**

SDS 271 PLANNING AND THE DEVELOPMENT PROCESS

Examines planning as applied to industrial, housing, transport, and infrastructure and land development. Takes into account the spatial and intersectional implications of planning in these sectors.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 272 PLANNING, LAW AND PRACTICE

Provides students with an understanding and working knowledge of planning legislation in the country together with general appreciation of legislation in related fields and its implication for the planning process. The course also aims to develop in students a critical awareness of planning procedures and the role and responsibilities of the professional planner in rural and urban context.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 273 STRATEGIES IN RURAL AND URBAN PLANNING

Examines the analytical models and management techniques commonly used to assist decision making in both rural and urban settings and will focus on some selected models and techniques.: population estimation, social and spatial analysis, economic based and multiplier analysis, optimization methods, system simulation and dynamics, project appraisal and project dynamics, project appraisal and proactive planning, program evaluation, rural and urban modeling and urban policy analysis.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 274 UTILITIES MANAGEMENT

Examines the nature and the role of transports systems, energy systems, and water systems in the mainly urban context with special reference to high density development. The topics will include among others the nature and characteristics of passenger transport - its management and functions, energy supply systems – supply and demand analysis.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 275            DEVELOPMENT COMMUNICATION

Explores different communication techniques as they apply to sustainable development.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 276            HAZARD MANAGEMENT

Deals with geo-environmental and man-made hazards and its impact to the environment and affected communities.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 277            PLANNING, ENVIRONMENT AND SUSTAINABILITY

Focus on the interface between planning systems and environmental management using the concept of sustainable development as an integrating conceptual framework. The evolution of the concept of sustainable development is discussed and attention is focused on the development and use of sustainability indicators, policies for sustainability and the transition to sustainable development paths.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 245            WATER RESOURCE MANAGEMENT

Overview of water resources planning and management, including the basic principles of hydrology and hydrogeology; the social, economic and policy framework for water resources management; application of environmental criteria for water supply projects; regional water supply planning issues ; emerging technical and policy issues related to national, state and local water resources management.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 251            RURAL AND URBAN DEVELOPMENT

Studies rural and urban areas, their nature, structure/ function, and change / problems and relate them sustainable development issues.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 258            HUMAN ECOLOGY

Models of human adaptation to various environmental and socio-cultural settings, and patterned responses to changes in these setting as a result of technological advances and urbanization.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 262            ECONOMY AND ECOTOURISM DEVELOPMENT

Designs, monitor, evaluate, and improve ecotourism as a tool for poverty alleviations and biodiversity conservation through sustainable practices and principles.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 263            COMMUNITY-BASED ENTREPRENEURIAL DEVELOPMENT

Farm and non-farm small businesses grounded on the foundation of shared understanding about public entrepreneurship where leadership training, community driven planning and applied research and entrepreneurial support organizations are key to its sustenance.

Credit                : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s)    : SDS 201

SDS 264            POPULATION, CONSUMPTION AND CONSUMERISM

Household consumption patterns affecting the environment, the changes of consumer habits that cause damage or would benefit the environment and whose data base with input-output models is used to calculate impacts of different kind of consumer expenditure.

Credit                : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s)    : SDS 201

SDS 265            FARMING SYSTEMS DESIGN FOR SUSTAINABILITY

Principles and strategies for designing sustainable farming systems or agricultural production characterized by social, political, and economic conditions in the context of global environment.

Credit                : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s)    : SDS 201

SDS 269            INTEGRATED WASTE MANAGEMENT

System assessment for wastes collection and recovery and institutional linkages disposal strategies in private – public partnership.

Credit                : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s)    : SDS 201

**AREA OF CONCENTRATION:  
Sustainable Environmental Education (SEE)**

SDS 281            EDUCATION FOR SUSTAINABLE DEVELOPMENT

The pivotal aim of this course is the development of method, procedures and competencies necessary of teaching environment, environmental protection and sustainable development. It includes principles of environmental ethics towards enhancement of knowledge, skills, attitude and values; development of testing curriculum, projects on environment and sustainability focus on resources like water, energy and biodiversity and other resources.

Credit                : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s)    : SDS 201

SDS 282            ENVIRONMENT AWARENESS AND SUSTAINABILITY IN  
SCHOOL AND COMMUNITIES

Focuses on environmental education in schools and communities. Through the schools and communities, the course will bring together students, teachers, administrators for schools or people and officials to the community on how to manage the school or community resources to efficiently address issues of water, energy, waste, biodiversity, health and other resource management issues.

Credit                : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s)    : SDS 201

SDS 283            INFORMATION, EDUCATION COMMUNICATION FOR SD

The purpose of this course is to equip students with some skills in development of materials on information and communication strategies to raise awareness on environment and sustainable development issues.

Credit            : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 284            INFORMATION AND COMMUNICATION TECHNOLOGIES  
FOR SD

Deals with the use of information technology and communication to access knowledge and resources about global trends, emerging technologies and programs on environment and sustainable development websites; databases for environmental issues.

Credit            : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 248            AQUATIC ECOLOGICAL AND RESOURCES MANAGEMENT

Human exploitation of foreshore and onshore minerals deposits including the continental and deep ocean floor deposits submarine waste dumping, marine, fresh and brackish water resources on tropical coast and the objectives and techniques of management, analysis and modeling of resource use and knowledge of techniques for promoting sustainable harvesting of resources, resource management failures of the past, tropical coastal aquaculture, its environmental impacts, and interaction between capture and culture fisheries.

Credit            : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 253            PEACE AND CONFLICT MANAGEMENT

Offers fundamental concepts and principles in understanding peace and conflict – related issues. It explores basic approaches in conflict resolution and management in both traditional and modern settings. It also relates the issue to the building of a culture of peace towards sustainable development.

Credit            : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 254            GENDER AND DEVELOPMENT

Analysis of sex/gender differentiation; theories of gender inequality, and analysis of the ways women and men effect, and are affected by environment.

Credit            : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 255            INDIGENOUS KNOWLEDGE MANAGEMENT

Identification and rational utilization of indigenous knowledge system for environmental conservation and community development:

Credit            : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 256 SOCIETY, SCIENCE AND TECHNOLOGY

An analysis of the interrelationship between science, technology, culture and society.

Credit : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 201

SDS 261 TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT

Technological applications considering economic that enhances and protect the natural resource quantities and qualities.

Credit : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 201

SDS 263 COMMUNITY-BASED ENTREPRENEURIAL DEVELOPMENT

Farm and non-farm small businesses grounded on the foundation of shared understanding about public entrepreneurship where leadership training, community driven planning and applied research and entrepreneurial support organizations are key to its sustenance.

Credit : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 201

SDS 264 POPULATION, CONSUMPTION AND CONSUMERISM

Household consumption patterns affecting the environment, the changes of consumer habits that cause damage or would benefit the environment and whose data base with input-output models is used to calculate impacts of different kind of consumer expenditure.

Credit : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 201

SDS 268 ENVIRONMENT-FRIENDLY ECONOMICS

Innovative economics that promote environment-friendly and highly efficient utilization of resources to ensure sustainable growth and development.

Credit : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 201

SDS 269 INTEGRATED WASTE MANAGEMENT

System assessment for wastes collection and recovery and institutional linkages disposal strategies in private – public partnership.

Credit : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 201

**AREA OF CONCENTRATION:  
Sustainable Environmental Engineering (SEEng'g)**

SDS 241 ENVIRONMENTAL GEOLOGY

Geologic process, hazards and human activities that change geological environment.

Credit : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 201

SDS 242 ENVIRONMENTAL CHEMISTRY

Study of a major chemical cycles involved in environmental processes and chemical elements affecting life within ecosystem. Factors controlling these chemical cycles, interaction of atmosphere, water solid surfaces and life involved in chemical cycles.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 243 HEALTH AND ENVIRONMENTAL TOXICOLOGY

Hazardous waste management, classification and major characteristics of major groups of pollutants, controversy and concern about synthetic organic compounds, understanding dose-response and its relationship to LD50 and ED50, ecological gradients and tolerances. Process of biomagnifications and its importance in toxicology. Threshold effects of environmental toxins and how they can be controlled in the environment. Risk assessment in toxicology.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 245 WATER RESOURCE MANAGEMENT

Overview of water resources planning and management, including the basic principles of hydrology and hydrogeology; the social, economic and policy framework for water resources management; application of environmental criteria for water supply projects; regional water supply planning issues ; emerging technical and policy issues related to national, state and local water resources management.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 246 LAND RESOURCES MANAGEMENT

Review of ecosystems and modifiers in the system (climate, water, nutrients, etc), fundamentals of natural resource response that contribute to the successful land management. How to read and understand the land which includes the classification, suitability, productivity including mineral resources management. An interface between managers and mineral resources, focusing on a selection of practical topics related to minerals and mining. Role of mining activities in the development process, global, national, and provincial distribution of resources; policy issues relating to environmental, economic and political consequences of nonrenewable resource exploitation.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 247 ASSESSMENT OF ALTERNATIVE ENERGY RESOURCES

Alternatives to fossil fuels, geothermal, solar, waterpower, wind, tidal energy and others. Basic tools used to analyze and assess alternative energy and environmental futures, specific issues regarding resource scarcity – availability, energy quality, new technologies and technological change, conventional / renewable /perpetual / alternative energy sources and sustainable energy development.

Credit : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s) : SDS 201

SDS 249            INTEGRATED ENERGY MANAGEMENT

Global energy issues, objective, strategies, policies, and the environmental impacts of alternative energy sources, energy issues. Objectives, strategies, and policies, assess alternatives, appreciation of policy strategies and instruments and formulate an energy policy for a region.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 250            ENERGY SYSTEM DESIGN

Introduction to design of energy systems by synthetic and/or experimental procedures. Technical and economic feasibility study to be established.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 261            TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT

Technological applications considering economic that enhances and protect the natural resource quantities and qualities.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 265            FARMING SYSTEMS DESIGN FOR SUSTAINABILITY

Principles and strategies for designing sustainable farming systems or agricultural production characterized by social, political, and economic conditions in the context of global environment.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 269            INTEGRATED WASTE MANAGEMENT

System assessment for wastes collection and recovery and institutional linkages disposal strategies in private – public partnership.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 271            PLANNING AND THE DEVELOPMENT PROCESS

Examines planning as applied to industrial, housing, transport, and infrastructure and land development. Takes into account the spatial and intersectional implications of planning in these sectors.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s)    : SDS 201

SDS 273            STRATEGIES IN RURAL AND URBAN PLANNING

Examines the analytical models and management techniques commonly used to assist decision making in both rural and urban settings and will focus on some selected models and techniques.: population estimation, social and spatial analysis, economic based and multiplier analysis, optimization methods, system simulation and dynamics, project appraisal and project dynamics, project appraisal and proactive planning, program evaluation, rural and urban modeling and urban policy analysis.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 201

SDS 274 UTILITIES MANAGEMENT

Examines the nature and the role of transports systems, energy systems, and water systems in the mainly urban context with special reference to high density development. The topics will include among others the nature and characteristics of passenger transport - its management and functions, energy supply systems – supply and demand analysis.

Credit : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 201

SDS 276 HAZARD MANAGEMENT

Deals with geo-environmental and man-made hazards and its impact to the environment and affected communities.

Credit : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 201

SDS 277 PLANNING, ENVIRONMENT AND SUSTAINABILITY

Focus on the interface between planning systems and environmental management using the concept of sustainable development as an integrating conceptual framework. The evolution of the concept of sustainable development is discussed and attention is focused on the development and use of sustainability indicators, policies for sustainability and the transition to sustainable development paths.

Credit : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 201

SDS 301 INTRODUCTION TO SUSTAINABILITY ENGINEERING

Concept of sustainability engineering, including changing attitude and values towards technology and the environment. Tools for sustainability engineering including metrics of sustainability, principles of design for the environment, methods of pollution preventions, substitution of materials and, and the use of mass and energy balances in the design of sustainable systems. The concept of industrial ecology is also explored, where the flows of mass and energy through industrial systems are examined. Comparison of engineering decisions under the old paradigm of limitless resources and under the new paradigm of finite earth.

Credit : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 201

SDS 310 ENVIRONMENTAL LIFE CYCLE ASSESSMENT AND GREEN DESIGN

Cradle-to-grave analysis of new products processes and policies to avoid undue environmental harm and achieve extended product responsibility. Approaches and methods for life assessment and for green design of typical products and processes. Process-based analysis models, input-output and hybrid approaches for life assessment. Use of software programs in process analysis. A life cycle assessment project is required.

Credit : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 201

SDS 320            ADVANCED TOPICS IN AIR POLLUTION

Fundamentals of air pollution behavior, with emphasis on physical processes governing aerosols dynamics. Characterization of aerosol populations, studies of particle coagulation and interaction with surfaces and examination of control technology principles. Air pollution data acquisition, interpretation and management will also be discussed. The subject of the matter is developed through references to current practice, critique of completed design, design exercises and field trips.

Credit                : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s)    : SDS 201

SDS 330            WATER QUALITY ENGINEERING

Fundamentals and engineering aspect of water quality. Basic principles of water chemistry, physical, chemical and biological phenomena affecting water quality; and application and examination of water quality using titrimetric, spectrometric, potentiometric and reductive / oxidative techniques.

Credit                : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s)    : SDS 201

SDS 340            SUSTAINABLE PROCESSING OF ENGINEERING MATERIALS

Deals with environmentally, economically, and socially viable routes of materials and processing and develop sustainable processes that minimize pollution, wastes, and energy consumption, while increasing recyclability and adding value to waste materials.

Credit                : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s)    : SDS 201

SDS 350            ENVIRONMENTAL AUDIT

Environmental Concerns. Audit as a Management Tool. The Structure of Environmental Audit. Waste Audits. Advantages and Disadvantages of Environmental Audits.

Credit                : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s)    : SDS 201

SDS 360            ENVIRONMENTAL RISK ASSESSMENT AND RISK  
MANAGEMENT

Identification, evaluation and assessment of risk that has the potential of harm to the environment, resources and human health. This course also includes the application of the identified risks in managing the environmental system or specific ecosystem posed with possible contamination. This requires students' knowledge of the basic statistical probability theory.

Credit                : 2 units (1 lecture, 1 unit fieldwork)  
Prerequisite(s)    : SDS 201

SDS 390            SPECIAL TOPICS IN SUSTAINABLE ENVIRONMENTAL  
ENGINEERING

Various approaches to sustainable development looking at major theories of international development and how they are applied in practical situations. A closer look at on – going development projects in selected countries with implication to the role of engineering (and engineers). Analysis of the project from engineering point of view within the context of sustainable development. Field trip to the development project site.

Credit                : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 301

SDS 391            SPECIAL PROBLEMS IN SUSTAINABLE ENVIRONMENTAL  
ENGINEERING

Supervised individual research on technological applications of engineering or reference to existing development projects in different communities and localities. Project proposal and initialization as expected output of course.

Credit            : 2 units (1 lecture, 1 unit fieldwork)

Prerequisite(s) : SDS 301