

COURSE: STOCK AND FLOW MODELS
AUTHOR: UOM
THEME: KEEP RELEVANT THEMES: RENEWABLE ENERGY , SUSTAINABLE HOUSING, SUSTAINABLE FOOD SYSTEM, CIRCULAR ECONOMY
MODULE: 4
SESSION:3
LECTURE TOPICS: 1. RECAP OF MAIN NOTIONS OF SYSTEM DYNAMICS AND SYSTEMIC ARCHETYPES 2. STOCK AND FLOW DIAGRAMS 3. SCENARIO AND SENSITIVITY ANALYSIS 4. CASE STUDY: RENEWABLE ENERGY
TARGET GROUP: END-USERS OF THE PROJECT (HE STUDENTS)
INTEGRATION INTO CURRICULUM: integration into the school/university curriculum, connection to other disciplines and subjects if applicable
LEARNING OUTCOMES: maximum 5 learning outcomes based on Bloom’s Taxonomy in terms of students’ knowledge, comprehension, application, analysis, synthesis. <ul style="list-style-type: none"> - Knowledge: To understand stock and flow diagrams and the mathematical equations that govern them - Comprehension: To understand the behavior of stocks, flows, delays and non-linearities - Application: To apply the gained knowledge in developing simple quantitative models - Analysis: To understand the behavior of the models and design experiments - Synthesis: To transform the insights from the models into actionable recommendations
LECTURE OBJECTIVES: <ol style="list-style-type: none"> 1. LEARN TO UNDERSTAND STOCK AND FLOW DIAGRAMS AND THEIR BEHAVIOR 2. UNDERSTAND HOW TO BUILD QUANTITATIVE MODELS 3. BUILD QUANTITATIVE MODEL ON THE ISSUE OF RENEWABLE ENERGY AND ANALYSE ITS BEHAVIOR
LECTURE DURATION: 60 MIN
GREEN SKILLS ADDRESSED: (KEEP RELEVANT ONES FROM THE LIST) DESIGN SKILLS , LEADERSHIP SKILLS, MANAGEMENT SKILLS, CITY PLANNING SKILLS, LANDSCAPING SKILLS, ENERGY SKILLS, FINANCIAL SKILLS , PROCUREMENT SKILLS, WASTE MANAGEMENT SKILLS, COMMUNICATION SKILLS
SDGS ADDRESSED: GOAL 7, GOAL 13
LECTURE DEVELOPMENT
BEFORE: preparation prior to the lesson
LECTURES IN PPT FILES, A DOCUMENT CONTAINING ALL THE MATERIAL FOR THE LECTURE, MULTIPLE CHOICE QUESTIONS TO ASSESS THE LEVEL OF UNDERSTANDING



<p>INTRO: ideas for activating the student’s background knowledge or ice breaker</p> <p>RECAP OF NOTIONS OF SYSTEM DYNAMICS AND SYSTEMIC ARCHETYPES</p>			
<p>DURING:</p>			
TIME	TYPE OF ACTIVITY	LEARNING ACTIVITIES	(VISUAL) AIDS
5 MINUTES	PRESENTATION: RECAP CAUSAL LOOP DIAGRAMS AND SYSTEMIC ARCHETYPES	PRESENTATION ON CAUSAL LOOP DIAGRAMS AND REVISION OF SYSTEMIC ARCHETYPES	PPT FILES
20 MINUTES	PRESENTATION STOCK AND FLOW MODELS	PRESENTATION OF: 1) STOCK AND FLOW MODELS 2) MATHEMATICAL EQUATIONS 3) BEHAVIOR OF MODELS	PPT FILES
5 MINUTES	PRESENTATION OF APPROPRIATE SOFTWARE	PRESENTATION OF THE APPROPRIATE SOFTWARE	SOFTWARE (VENSIM.COM)
25 MINUTES	RENEWABLE ENERGY	PRESENTATION OF: 1) GENERAL INFORMATION ON RENEWABLE ENERGY 2) IMPORTANT ELEMENTS IN THE SYSTEM OF RENEWABLE	PPT FILES, CO-CREATION ACTIVITY



		ENERGY 3) DEVELOPMENT OF CAUSAL LOOP DIAGRAM OF SYSTEM (CO-CREATION ACTIVITY FOR STUDENTS)	
5 MINUTES	DISCUSSION OF THE RESULTS	DISCUSSION WITH THE STUDENTS ABOUT THE POTENTIAL BEHAVIOR OF THE SYSTEM AND POLICY DESIGN	PPT FILE, CO-CREATION ACTIVITY
<p>BEYOND: Homework: Multiple Choice Questions, Assessment: 100% MCQ Recommended additional materials: Papers, free textbook, case studies, the ppt files will be provided.</p>			

