MDP PROGRAM

NATURAL SCIENCES AND ENGINEERING

SYLLABUS

BASIC CONCEPTS AND MODELS FOR WATER STORAGE AND IRRIGATION

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SYLLABUS: WATER STORAGE AND IRRIGATION

Course goals

The course seeks to instill knowledge and give students skills and expertise. At the end of this course the student is expected to have the necessary knowledge in the field of water storage and irrigation in order to be able to formulate water policy that corresponds to the needs of sustainable development. Additionally, this course focuses on the socio-economic and environmental analysis.

Pedagogical approach

Instruction will be centered on the following points:

- This course is based on the active participation of students. Readings will be given for each lecture and class will be supplemented by teacher-led discussions amongst the students.
- Students will apply their knowledge accumulated during the course to a small project at the end of the module
- Visits to industry or in the field will be organized regularly

Teaching materials

A video projector will be needed for the professor's presentations and for illustrating concepts. Computer access will be necessary for all students.

Evaluation

Concepts and techniques acquired during the course will be assessed by:

- Two individual exams will that will take place in the middle and at the end of the course. These will each count for 30% of the final grade.
- A small project done in teams of two and supervised by the instructor will count for 40% of the final grade.

Prerequisites

None. However, it will be helpful to have experience using the internet to search for information and to have word processing skills.

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Course schedule

Chapter 1: Background on hydraulics

1.1. Concept of urban water

1.2. Concept of rural water

1.3. Estimation of water needs

1.4. Phasing and timing of water supply projects

Chapter 2: available water resources

2.1. Water issues

2.2. Groundwater

2.3. Surface water

2.4. Other resources

Chapter 3: Collection, movement and storage of the water supply

3.1. Water capture

3.2. Supply pipes

3.3. Water storage systems

3.4. Drinking water reservoirs

3.5. Issues of water storage and sustainable development

Chapter 4: Elements and structures of an irrigation network

4.1. Elements of an irrigation network

4.2. Starting an irrigation network

4.3. Operation of an irrigation network

4.4. Maintenance of an irrigation network

Chapter 5: Irrigations methods

5.1. Irrigation by submersion

5.2. Furrow irrigation

5.3. Sprinkler irrigation

5.4. Drip irrigation

5.5. Issues of irrigation and sustainable development

Chapter 6: Concepts tied to plants and soil

6.1. Concepts tied to plants

6.2. Concepts tied to soil

6.3. Interpretations of physical-chemical water, soil and plant analyses

Chapter 7: Determining water needs of plants

7.1. Calculating potential evaporation

7.2. Studies of the water needs for crops