Water Supply and Sanitation Engineering Module				
Course Title	Water Quality & Treatment			
Course Number	WRIE3121			
Program	B.Sc. in Water Resources and Irrigation Engineering			
Module name	**Water Supply and sanitation Engineering**			
Module Coordinator	Name: . …….. Office location . …….. Mobile: . ……; e-mail: ……. Consultation Hours: _____			
Instructor Name	Name: . …….. Office location . …….. Mobile: . ……; e-mail: ……. Consultation Hours: _____			
Course Information	Academic Year :_____ Year : **III** Semester: **II** Meeting Day: To be arranged at the beginning of the semester Meeting Time: To be arranged at the beginning of the semester Meeting Location: To be arranged at the beginning of the semester			
ECTS	**3 ECTS**			
Students' work load	**Lecture**	**Tutorial**	**Lab**	**Home study**
	1	0	2	2
Course Objectives and Competences Acquired	The aim of this course is to introduce students with the concepts of water quality, organic and in-organic compounds that can pollute water. Students can analyze the physical, chemical and biological components of water, understand the standards of drinking and Irrigation water standards based on the physical, chemical and biological components of water at the end of this course. Students are also capable to suggest suitability of given water for different purposes such as irrigation, domestic supply or industrial requirement. Students will also be familiar with different water treatment methods.			
Course Description	Water quality pollution and analysis: types and sources of pollution, water quality changes, impurities of water. Organic and in-organic components of surface water and groundwater, Laboratory test procedures: Physical, chemical and biological examination of water. Drinking and Irrigation water standards. Water quality and health; Water quality and Agriculture; Water treatment; treatment methods; Basic water treatment: sedimentation, coagulation, slow sand filter, roughening filter, rapid sand filter, disinfections. Treatment methods for rural water supply, treatment of saline/sodic water, treatment of waste water, treatment methods for rural water supply.			
Pre-requisite	Nil			
Status of Course	**Compulsory**			
Syllabus				
Week	**Topics and contact hours (tutorial, laboratory and practical)**			**Required reference (topics and pages)**

	1. Water quality pollution and analysis **(Lec=5hrs, Tut=5hrs)** 1.1 Introduction 1.2 types and source of pollution 1.3 water quality changes 1.4 impurity of water schemes	Bride, G.S. (1989) Water supply and Sanitary Engineering. Dhanpat Rai & Sons, Delhi.
	2. organic and inorganic components of surface water and ground water **(Lec=5hrs, Tut=5hrs)** 2.1 Introduction 2.2 laboratory test procedures 2.2.1 physical, chemical and biological examination of water 3. Drinking and irrigation water standards **(Lec=5hrs, Tut=5hrs)** 3.1 introductions 3.2 water quality and health 3.3 water quality and agriculture	Bride, G.S. (1989) Water supply and Sanitary Engineering. Dhanpat Rai & Sons, Delhi.
	4. water treatment **(Lec=10hrs, Tut=10hrs)** 4.1 Introduction 4.2 Treatment methods 4.3 Basic water treatment 4.3.1 Sedimentation 4.3.2 Coagulation 4.3.3 Slow sand filter 4.3.4 Roughening filter 4.3.5 Rapid sand filter 4.3.6 Disinfections 5. Treatment methods for rural water supply **(Lec=5hrs, Tut=5hrs)** 5.1 Introduction 5.2 Treatment of saline/solid water 5.3 Treatment of waste water	Bride, G.S. (1989) Water supply and Sanitary Engineering. Dhanpat Rai & Sons, Delhi.
Summary of Teaching and Learning Method	Lecture, tutorials, laboratory activity, discussion, individual work, problem solving At the end of each session assignment will be given.	

Assessment		
Assessment arrangements	15% Test 1	**Chapters** Test 1=chapter 2,3&4
	15% Quizzes	All chapters
	15% assignments	Chapters 2,3&4
	15% lab report and tests	Lab activities
	40% Final-exam	All chapters

Course Expectation	**Preparedness and participation**: both students and the teacher should be prepared since education is an interactive process. Students should be active participants in the teaching gleaning process. They should be interested to the course and come to class
	with the necessary materials such as exercise books and pen. In addition, they should to take responsibility in their education. **Teachers are also expected be prepared and interested to the course, which they**
	Attendance: A student required to attend at least 85 % of the classes lecture and 100%
Reference	**Thomas D. Waite, 1994. Princples of Water Quality, Academic Press inc., New York.**