



FIRST SEMESTER 2016-2017
Course Handout (Part II)

Date: 02/08/2016

In addition to Part I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No : CE G525
Course Title : Water Resources Planning and Management
Instructor-in-charge : R. SRINIVAS

Course Description and Scope & Objective

This course aims at imparting concepts and significance of water resources planning, management and development. Watershed management is an integral aspect to be considered in water resources planning and management. Soil water and vegetation are very vital natural resources and watershed affects all of them. The sustained productivity of food, fiber etc. can be ensured by judicious and effective planning and management of soil, water and vegetation. Various advanced mathematical programming techniques will be covered with practical applications with numerous case studies.

Text Books :

- T1.** Vedula S. and P. P. Majumdar, Water Resources Systems: Modeling Techniques and Analysis, Tata McGraw Hill Publishing Company Limited, New Delhi, 2005.
T2. Loucks D. P. and Eelco van Beek, Water Resources Systems Planning and Management: An Introduction to Methods, Models and Applications, UNESCO Publishing, 2005.

Reference Books/Journals

- R1.** Goodman, Alvin S. Principles of Water Resources Planning, Prentice-Hall Inc, Englewood Cliffs, New Jersey, 1984.
R2. Jain, S.K. and Singh V. P. (2003) Water Resources Systems Planning and Management, Elsevier.

Course Plan:

Lecture No	Learning Objectives	Topics to be covered	Reference
1,2,3, 4	Introduction, Water Resource Systems Modeling: Its Role in	Conceptual framework and scope for efficient water resources planning	CH-1(T-1) CH-2(T-2)





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	Planning and Management		
4,5,6	Study basic engineering and economic planning concepts	General principles of project analysis, social welfare functions, indifference curves and tradeoff	CH-3(T-1)
7, 8	To assess the water needs of the population and necessity of water conservation	Data for demographic studies, water conservation and other nonstructural alternatives	CH-4(T-1)
9, 10	Water resources systems: Multidisciplinary Adaptive Process	Identification and evaluation of alternative designs and operating policies. Screening, evaluation of environmental impacts etc.	CH-5(T-1)
11, 12, 13, 14, 15, 16	River Basin Water Quality Management	Point and Non-point source pollution in water resources, Water Quality Management Processes, Mass Balance Approach in complete mix and plug flow reactor	Suppl. Lecture notes
17, 18, 19, 20	Groundwater Sustainability and its Management	Groundwater Hydrology, Well Hydraulics, Yield of a Well, Groundwater management	Suppl. Lecture notes
21, 22	Analysis of risk and uncertainty involved probabilities	Stream flow time series, duration analysis, frequency analysis, statistical decision theory	CH-11(T-1)
23, 24	Stochastic Programming Models in Water Resources Planning and Management	Uncertainty in water resources management through different examples	CH-11(T-1)
25, 26, 27	Study of mathematical models for development of planning alternatives-I	Use of computers and mathematical back ground, necessity of optimization and simulation techniques	CH-12(T-1)
28, 29	Study of mathematical models for development of planning alternatives-II	Study of Linear, Nonlinear programming, simulation analysis	CH-13(T-1)
30, 31, 32	Formulation of	Case studies of irrigation	T3



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	mathematical model for various case studies	planning, reservoir operation, hydro power optimization	
33, 34	Study of Multiobjective analysis, techniques and applications	Goal programming, weighting and constraint techniques	CH-2, 7,8 (T-1)
35, 36, 37	Introduction to modern tools –I I	Fuzzy logic and Artificial Intelligence	CH-5 (T-2)
38, 39, 40	Study of practical water resources case studies in India	Various water resources problems in the form of case studies	CH (R-2)

Evaluation Scheme

EC No.	Evaluation component	Duration	Weightage (%)	Date, Time and Venue	Nature of component
1	Mid semester	90 min.	25	<TEST_1>	CB
2	Software demonstration	15-20 min	10	15/10	OB
3	Project* (Includes term paper and seminar)		30	Seminar I – 12/8 Mid sem – 3/10 Final seminar – 18/11 Final report – 25/11	OB
4	Comprehensive Examination	3 Hours	35	<TEST_C>	CB/OB

*During the semester each student will work in a team on a project dealing with water resources planning and management. These projects will deal with some aspect of a real, complex water resources planning and analysis issue of current interest to the world, nation, or a particular State. The projects typically are interdisciplinary and consider such aspects of water resources planning and management as: engineering, law; economics; hydrology, climatology, hydrogeology; environmental health; computer modeling; population growth; land use planning; regional development; or politics. Each group will make an oral presentation of their results to the class and submit a final report.

The purposes of the term project are:

1. To enable you to explore in-depth an aspect of the subject of water resources planning and management.
2. To provide experience in the formulation, execution and presentation of an engineering investigation in the area of water resources planning and management.



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3. To provide a teamwork experience dealing with the interdisciplinary nature of water resources planning and management.



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Steps in Carrying out the Project

The steps in carrying out the project are:

1. Prepare a proposal in MS Word and email it to the instructor specifying the objective of your project and outlining how you plan to go about executing it.
2. Present an oral report in class on the date posted on the class assignment web page.
3. Send a written report (in MS Word) to the instructor on the date posted on the class assignment web page.

Before beginning your project, you need to prepare a project proposal and submit it to the instructor for approval and feedback. This proposal should be about one page in length. The instructor will review the proposals and provide comments for the student to revise the proposal for final submittal and approval.

The proposal should contain:

- A minimum of 5 bibliographic citations relevant to your proposed project.
- Definition of the problem including relevant background.
- Discussion (preliminary) of the proposed methods of solution of the problem.
- Anticipated data needs.
- Anticipated problems in carrying out the project.
- Team members.
- Assignment of tasks to team members.

Chamber Consultation Hour: Tuesday 4-5 pm at 6021-K

Notices: All notices concerning the course will be displayed on Civil Engineering Group Notice Board/ Nalanda

Make-up Policy:

1. Make-up will be granted only on genuine reasons. However, prior permission is must.
2. For medical cases, a certificate from the concerned physician of the Medical Centre must be produced.

Academic honesty and integrity Policy:

Academic honesty and integrity of high quality is expected to be maintained by all of the students throughout the Semester and any kind of academic dishonesty or indulgence in illegitimate practices is not acceptable.

Instructor-in-charge
CE G525



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