CE213 Jan 3:0

Systems Techniques in Water Resources & Environmental Engineering

Instructor

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Teaching Assistant

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Department: Civil Engineering

Course Time: Tue., Thu., 9:30 - 11 AM

Lecture venue: Lecture Hall, First Floor, Dept of Civil Engg

Detailed Course Page: http://civil.iisc.ernet.in/~nagesh/stwree.htm

Announcements

http://civil.iisc.ernet.in/~nagesh/stwree.htm

Brief description of the course

Optimization Techniques - Constrained and Unconstrained optimization;

Kuhn-Tucker conditions; Linear Programming (LP),

Dynamic Programming (DP); Multi-objective optimization;

Applications in Water Resources, water allocation, Reservoir sizing,

Multipurpose reservoir operation for hydropower, flood control and irrigation.

Review of probability theory;

Stochastic optimization - Chance constrained LP, Stochastic DP;

Surface water quality control; Simulation - Reliability,

Resiliency and Vulnerability of water resource systems.

Prerequisites

none

Syllabus

Optimization Techniques - Constrained and Unconstrained optimization;

Kuhn-Tucker conditions; Linear Programming (LP),

Dynamic Programming (DP); Multi-objective optimization;

Applications in Water Resources, water allocation, Reservoir sizing,

Multipurpose reservoir operation for hydropower, flood control and irrigation.

Review of probability theory;

Stochastic optimization - Chance constrained LP, Stochastic DP;

Surface water quality control; Simulation - Reliability,

Resiliency and Vulnerability of water resource systems.

Course outcomes

* Learning Deterministic optimization techniques such as Linear Programming, Dynamic Programming, Optimization using Calculus.

* Learning Stochastic Optimization techniques such Stochastic Dynamic Programming, Chance Constrained Liner Programming.

* Application of above system techniques in the files of Water Resources and Environmental Engg such as reservoir sizing, planning and operation, river water quality management, water supply systems, irrigation management.

Grading policy

20% for assignments, 15% for mid-term, 15% for term-paper and 50% end-term exam.

Assignments

Assignments sheets (4-5) are posted in the website

http://civil.iisc.ernet.in/~nagesh/stwree.htm

Resources

http://civil.iisc.ernet.in/~nagesh/stwree.htm

1. Loucks, D.P, Stedinger, J.R and Haith,D.A, 'Water Resources Systems Planning and Analysis', Prentice Hall, Englewood Cliffs, N.J, 1981.
2. Mays,L.W and Tung, Y-K, 'Hydrosystems Engineering and Management', McGraw Hill, 1992.

3. Vedula, S. and Mujumdar, P. P., 'Water Resources Systems: Modelling Techniques and Analysis', Tata-McGraw Hill, 2005.
4. K. Srinivasa Raju and D. Nagesh Kumar, Multicriterion Analysis in Engineering and Management, PHI Ltd., New Delhi, 2010, pp.288.