

| CE 447 | |
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| Water Supply and Drainage Systems | |
| Department of Civil Engineering | |
| King Saud University | |
| Course Description: CE 447 Water Supply and Drainage Systems (Required for a BSCE degree) | Quantity of water, wastewater, and storm water. Design of water supply system, including pumping stations and storage capacity. Design of sanitary and storm sewer systems. Appurtenances of water, sanitary, and storm networks. Application of computer programs for design of water and sewer networks. Sewers construction and maintenance. 2(2,1,0) |
| Prerequisite | CE 322 (Hydraulics) and co-requisite CE422 (Hydrology), prerequisites by topics : <ul style="list-style-type: none"> • Understanding closed conduits hydraulics: flows, pressures, velocities, and head losses. • Understanding open channel hydraulics. • Understanding surface water and groundwater resources. |
| Course Learning Objectives | Students completing this course successfully will be able to : <ol style="list-style-type: none"> 1. Understand basic water supply and drainage systems importance in society. 2. Practice closed and open system water hydraulics. 3. Determine water, sanitary, and storm systems requirements for a given community. 4. Understand procedures for analysis and design of water supply and drainage systems, plus systems required appurtenances. 5. Use available computer programs for simple design and analysis of water and sewer systems. 6. Understand requirements for construction and maintenance of sewer systems. |
| Topics Covered | <ul style="list-style-type: none"> • Quantity of water and wastewater. • Water supply system, including storage and appurtenances. • Closed conduits hydraulics (review). • Analysis and design of water networks. • Pumping stations and pumps selection. • Quantity of storm water. • Sewerage systems and appurtenances. • Hydraulics of sewers. • Design of sanitary and storm sewers. • Sewer construction and maintenance. |
| Class/ tutorial Schedule | Class is held two times per week in 50-minute lecture sessions. There is also a 50-minute weekly tutorial associated with this course. |

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| Computer Applications | Commercial software for design of water and sewer networks is practiced and applied during that course with the help of computer Lab. sessions. Conducting a practical project (networks design) and submitting a report showing all the program capabilities, input data, results and discussions. |
| Contribution of Course to Meeting the Professional Component | <ol style="list-style-type: none"> 1. Students learn the environmental importance of water and sewer systems for a community. 2. Students learn ways of estimating water demands and sewage production rates for a community. 3. Students recognize the importance of their profession in water conservation and avoidance of water pollution. |
| Relationship of Course to Program Outcomes | <ol style="list-style-type: none"> 1. Students apply mathematics and hydraulics principles. 2. Students are able to recognize the needs for water and sewer systems. 3. Students are able to evaluate system and design requirements. 4. Students are encouraged to recognize the different water and sewer system appurtenances and choose appropriate materials. 5. Students recognize the need for continuous technical updating to follow regulations and codes. 6. Students recognize the important role of computers in design and analysis of water and sewer systems. 7. Students recognize their role in team work with other professionals in a project. 8. Students recognize the importance of reading and understanding technical contents in English for life-long learning and improved performance. 9. Students recognize the ethical and professional responsibility in achieving accurate water and sewer system analysis for safe and economical design, and its impact on the well-being of society. |
| Textbook(s): Other Supported Material: | <ol style="list-style-type: none"> 1. T. J. McGhee, "Water Supply and Sewerage", by McGraw- Hill, 6th Ed. (1991). 2. Hammer, M. J. and Hammer, M. J. Jr. "Water and Wastewater Technology" 6th edition, Prentice-Hall, Inc., Englewood Cliffs, New Jersey (2007). 3. Viessman, Jr. W; Hammer M. J.; Perez E. M.; and Chalik, P. A. "Water Supply & Pollution Control", 8th ed. (International Ed.), Pearson Higher Education (2009) |