Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering		المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة

CE 675 Planning and Design of Water and Sewerage Networks

College: Engineering

Department: Civil

First: Course Definition

1- Course Code: CE 675

2- Units: 3

3- Semester:

4- Prerequisite:

5- Co-requisite:

6- Location (if not on main Campus):

Second: Course Objectives

1- To develop the requirements for proper planning of water distribution and wastewater collection networks.
2- To determine the design flow for water distribution and wastewater collection networks.
3- To develop the design of water distribution and wastewater collection networks and writing the design report.

1- Topics to be covered

Subject	No of Weeks	Units
Introduction	1	3
Estimation of water and wastewater flow	1	3
Hydraulics of water flow	1	3
Water distribution systems layout and planning	1	3
Design of water distribution systems	1	3
Computer analysis and design for water distribution network	1	3
Modern development in water distribution network	1	3

Hydraulics of sewage flow	1	3
Sewerage layout and planning	1	3
Design of sewerage	1	3
Computer analysis and design for Sewerage	1	3
Modern development in Sewerage	1	3
Preparation of design reports for selected local projects	1	3
Water distribution network and sewerage construction, cost and operation consideration	1	3

2- Course components (Total hrs in the Semester: 42

Lecture	Exercise	Other
42	-	0

3- Intended Learning Outcomes of the Course (ILO's)

a. *Knowledge*

i) Description of the knowledge to be acquired:

- Sources, characteristics and flow of water and wastewater.
- General requirements for proper planning and design of water distribution and wastewater collection.
- Water and wastewater flow in the network.
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ii) Teaching strategies to be used to develop that knowledge

- Class lectures.
- Term projects.
- Students' presentations.
- Group discussion.

iii) Methods of assessment of knowledge acquired

- Exams.
- Quizzes.
- Homework assignments.
- Term projects.

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b- Cognitive (Intellectual) Skills

i) Cognitive skills to be developed

- Concepts of master planning for water distribution and wastewater collection network.
- Water distribution and wastewater collection network analysis and control.
- Modeling and designing of water distribution and wastewater collection network.
- Investigation of alternatives for water distribution and wastewater collection network.

ii) Teaching strategies to be used to develop these cognitive skills

- Class lectures.
- Case studies analysis.
- Term projects.
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iii) Methods of assessment of students' cognitive skills

- Students' seminars and presentations.
- Term projects.
- Written reports.
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c. Interpersonal Skills and Responsibility

i) Description of the interpersonal skills and capacity to carry responsibility to be developed

- Decision making based on engineering analysis.
- Communication skills.
- Team work.
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ii) Teaching strategies to be used to develop these skills

- Class lectures.
- Term projects.
- Case studies analysis.

iii) Methods of assessment of students' interpersonal skills and capacity to carry responsibility

- Term project.
- Written reports.
- Students' seminars and presentations.

d. Communication, Information Technology and Numerical Skills

i) Description of the skills to be developed in this domain

- Literature research.
- Problems modeling.
- Utilization of computer applications in analysis and design.

ii) Teaching strategies to be used to develop these skills

- Class lectures.
- Case studies analysis.
- Computer lab sessions.
- Term projects.

iii) Methods of assessment of students numerical and communication skills

- Term projects.
- Written reports.
- Students' seminars and presentations.
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e. Psychomotor (if applicable) & Other Non-cognitive Skills

i) Description of the psychomotor or other skills to be developed and the level of performance required

- NA

ii) Teaching strategies to be used to develop these skills-

- NA

iii) Methods of assessment of student's psychomotor skills

- NA

4- Student Assessment Schedule

Serial	*Assessment tool (test, group project, examination etc.)*	*Week due*	*Weight*
1	Term Project – 1	3rd	15 %
2	Mid Term Exam -1	7th	15 %
3	Term Project – 2	10th	15 %
4	Term Project – 3	13th	15 %
5	Final Exam	16th	40 %

5- Student Support

- Providing electronic library of textbooks and scientific periodicals.
- Providing the necessary computer applications for the course.

6- Learning Resources

i) Essential Books (References)

- Gravity Sanitary Sewer Design and Construction (ASCE Manuals and Reports on Engineering Practice No. 60) American Society of Civil Engineers; 2nd edition, 2007. ISBN-13: 978-0784409008.
- Swamee, P. K. and Sharma, A. K. "Design of Water Supply Pipe Networks," Wiley-Interscience, 2008, ISBN-13: 978-0470178522.
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ii) Course Notes

- NA
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iii) Recommended Books

- Marston, A. and Fleming, T. "Sewers and Drains: A Comprehensive Discussion of Modern Sanitary Methods in the Design of Sewers and Sewerage Systems, in Their Laying-Out, Cost, and Construction and in the Disposal of Sewage, Nabu Press, 2010, ISBN-13: 978-1144377173.
- Neely, N."Sewer Design,", Nabu Press, 2011, ISBN-13: 978-1247814445.

iv) Electronic Books & Web Sites:
- Scientific journals and forums.
- Instructor's instruction.
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v) Periodicals
- ASCE scientific journals.
- EPA and IWA publications
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7- Course Evaluation and Improvement Processes

i) Strategies for Obtaining Student Feedback on Effectiveness of Teaching
- Students' questioners.
- Students' evaluation of course and instructor.
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ii) Other Strategies for Evaluation of Teaching by the Instructor or by the Department
- Public faculty seminars.
- Assessment by external evaluators of students achievements.
- **Instructor (Course) Report**
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iii) Processes for Improvement of Teaching
- Assessment of students' work by external examiners.
- Analysis of students' evaluation of course and instructor.
- Seminars by industry professionals.
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iv) Processes for verifying standards of student achievement
- Check marking by an independent faculty member of a sample of student work.
- Periodic exchange and remarking of a sample of assignments/exams with a external evaluator.
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v) Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Assessment and evaluation of the level of achieving the course outcomes through a continuous improvement process (part of a quality assurance system established by the university),
- Consequently, actions are to be taken to improve the course delivery when necessary.
- Review of the course objectives, outcomes and curriculum every 2 years.