

<p>Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
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CE 632 Drainage Engineering

College: Engineering

Department: Civil

First: Course Definition

1- Course Code: CE 632

2- Units: 3

3- Semester:

4- Prerequisite:

5- Co-requisite:

6- Location (if not on main Campus):

Second: Course Objectives

- To develop understanding of water transportation mechanisms in soils and parameters related to drainage.
- To be able to plan and design drainage projects
- To develop understanding of the computer applications in drainage designs

Third: Course Specifications

1- Topics to be covered		
Subject	No of Weeks	Units
Introduction to drainage engineering	1	3
Water-logging and salinity problems	2	6
Drainage investigation and scope for improvement, drainage coefficient and its determination.	2	6

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Surface Drainage System: Types and design of surface drainage system.	3	9
Subsurface Drainage System: Types, steady and unsteady state flow through subsurface drains, installation and design of subsurface drains, filter design for tiles drains.	2	6
Integrated planning for irrigation and drainage in command areas.	4	12

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:

- Theory of seepage flow in porous media.
- Water-logging and salinity problems
- Examine the design of surface drainage system.
- Subsurface Drainage System design.
- Drainage efficiency.

ii) Teaching strategies to be used to develop that knowledge

- Formal lectures develop the theory and methods used in analysis and design.
- Example problems.
- A laboratory section will be used to reinforce lecture and study materials through problem discussion, lab assignments, field trips, and guest speakers

iii) Methods of assessment of knowledge acquired

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

b- Cognitive (Intellectual) Skills

- i) Cognitive skills to be developed***
- Advanced concepts of drainage system analysis and design.
 - Advanced drainage problem modeling.
 - Investigation of drainage system design alternatives.

- ii) Teaching strategies to be used to develop these cognitive skills***
- Class lectures.
 - Case studies analysis.
 - Term projects.

- iii) Methods of assessment of students' cognitive skills***
- Students' seminars and presentations.
 - Term projects.
 - Written reports.

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.

- 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.

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- 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.

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
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- ii) Teaching strategies to be used to develop these skills-**
- NA
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- iii) Methods of assessment of student's psychomotor skills**
- NA
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4- Student Assessment Schedule

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

- Murphy, D. W. "Drainage Engineering," Nabu Press, 2010
- Laycock, A. "Irrigation Systems," CABI; 1st edition , 2007.

ii) Course Notes

- NA
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iii) Recommended Books

Harry R. Cedergrén, "Seepage, drainage and flow net", Wiley-Interscience; 3rd edition (January 11, 1997) ISBN-10: 047118053X

iv) Electronic Books & Web Sites:

- Scientific journals and forums.
- Instructor's instruction.

v) Periodicals

- Journal of irrigation and drainage engineering ASCE
- Irrigation Australia Journal
- Irrigation & Drainage Systems Engineering (IDSE)

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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.

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

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.

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.

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.