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| <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 650 Advanced Asphalt Materials

College: Engineering

Department: Civil

First: Course Definition

1- Course Code: CE 650

2- Units: 3

3- Semester:

4- Prerequisite:

5- Co-requisite:

6- Location (if not on main Campus):

Second: Course Objectives

- 1- To develop teamwork and communication skills required for civil Engineering projects.
- 2- To Use the Advanced asphalt concrete (SUPERPAVE) mix designs.
- 3- To provide a comprehensive education in the fundamentals of construction materials quality control and inspection.
- 4- To provide experiences in nondestructive testing.
- 5- To provide experiences in pavement thickness design.
- 6- To learn work in teams to practice professional report writing and presentation of material engineering results and summaries.

Third: Course Specifications

| 1- Topics to be covered | | |
|---|-------------|-------|
| Subject | No of Weeks | Units |
| Advanced Asphalt Concrete (SUPERPAVE) Mix Designs | 3 | 9 |
| Aggregates | 1 | 3 |
| Admixtures | 2 | 6 |
| Production and Construction | 2 | 6 |

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| Quality Control and Inspection | 2 | 6 |
| Nondestructive Testing | 1 | 3 |
| Pavement Thickness Design | 2 | 6 |
| Materials Engineering Reports | 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:

- Advanced asphalt concrete (SUPERPAVE) mix designs.
- Aggregates.
- Admixtures of hot asphalt concrete.
- Production and construction of asphalt pavements.
- Quality control and inspection of materials.
- Nondestructive testing for asphalt pavements.
- Pavement Thickness Design.
- Materials engineering reports.

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.

b- Cognitive (Intellectual) Skills

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i) Cognitive skills to be developed

- Advanced asphalt concrete (SUPERPAVE) mix designs.
- Production and construction of asphalt pavements.
- Quality control and inspection of materials.
- Nondestructive testing for asphalt pavements.
- Pavement Thickness Design.

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.
- 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.

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| <p>ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> - Class lectures. - Case studies analysis. - Computer lab sessions. - Term projects. <p>iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> - Term projects. - Written reports. - Students' seminars and presentations. |
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e. Psychomotor (if applicable) & Other Non-cognitive Skills

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| <p>i) Description of the psychomotor or other skills to be developed and the level of performance required</p> <ul style="list-style-type: none"> - NA |
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| <p>ii) Teaching strategies to be used to develop these skills-</p> <ul style="list-style-type: none"> - NA |
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| <p>iii) Methods of assessment of student's psychomotor skills</p> <ul style="list-style-type: none"> - NA |
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4- Student Assessment Schedule

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

5- Student Support

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| <ul style="list-style-type: none"> - Providing electronic library of textbooks and scientific periodicals. - Providing the necessary computer applications for the course. |
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6- Learning Resources

i) Essential Books (References)

- Wang, L. "Mechanics of Asphalt: Microstructure and Micromechanics," McGraw-Hill Professional; 1st edition, 2010.
- Yoder, E. J. and Witczak, M. W. "Principles of Pavement Design," John Wiley & Sons, Inc.; 2nd edition, 1975.
- Roberts et al. "Hot Mix Asphalt Materials, Mixture Design and Construction," NAPA Education Foundation, 1997.

ii) Course Notes

- NA

iii) Recommended Books

- Hausmann, M. R. "Engineering Principles of Ground Modification," McGraw-Hill, Publishing Co., 1990.

iv) Electronic Books & Web Sites:

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

v) Periodicals

- Highway Research Board journal.
- Highway Research Bulletin.
- ASCE scientific journals.

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

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- Public faculty seminars.
- Assessment by external evaluators of students achievements.

- 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.