

## Construction & Building Engineering Courses (CB)

Transportation Engineering Courses Group

### CB 574 – Highway Design and Construction

#### COURSE INFORMATION

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Course Title: Highway Design and Construction

Code: CB 574

Hours: Lecture – 2 Hrs.                      Tutorial – 2 Hrs.                      Credit –3.

Prerequisite: CB 472

#### GRADING

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Class Performance/Attendance: 10%

Midterm # 1/Assignments – (7<sup>th</sup> Week): 30%

Midterm # 2/Assignments – (12<sup>th</sup> Week): 20%

Final Exam: 40%

#### COURSE DESCRIPTION

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Highway classification & process of location selections; Horizontal Alignment and details of geometric design including balance and sight distance ; Vertical alignment and details of geometric design ; At grade intersection , types , Canalization ; Intersection Control and traffic Signal, design of roundabouts ; Interchanges, types, principles of design examples ; Soil engineering for highway design ; Bituminous Material ; traffic load transformation , Equivalent Single Axle load Concept (ESAL) ; Design of flexible Pavements , AASHTO method of design , BCBR method of design ; Highway construction ; Highway Maintenance.

#### TEXT BOOK

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FUNDAMENTALS OF TRANSPORTATION ENGINEERING: A MULTIMODEL SYSTEMS by FRICKER, JON D. Publisher: John Pearson Education, Inc., Pearson Prentice Hall, Upper Saddle River, NJ USA

#### REFERENCE BOOKS

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Standard Handbook for Civil Engineers by F.S. Merrit Publisher: McGraw Hill book NY

Pavement Management for Airports, Roads and Parking lots by M.Y. Shahin  
Publisher: Chapman & Hall, New York 1994.

Egyptian Code for Highway by Ministry of Urban Planning Publisher: 1998.

Transportation and traffic Engineering Handbook by Institute of transportation  
Engineers Publisher: Prentice - Hall London " , 1982.

Handbook of Highway Engineering by R. Baker , van Nostrand Reinforced Co  
Publisher: New York, 1975.

#### COURSE AIM

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The course aims at introducing the student to the fundamentals of highway Engineering and its relation to the field of transportation.

#### SPECIFIC OUTCOMES OF INSTRUCTION

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- The student should be able to Clarify the procedures and special considerations for Highway Analysis , Planning & Design .
- The student should be able to understand the sequence in the analysis process and the factors affecting the design of the major components of highway project.

#### COURSE OUTLINE

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- Week Number 1:* Highway Classification & Process of location Selection.
- Week Number 2:* AASHTO Stopping Sight Distance, Passing Sight Distance  
Introduction to geometric design of highways, horizontal alignment and super-elevation calculations.
- Week Number 3:* Vertical Alignment, Sag/Crest Vertical Curves.
- Week Number 4-5:* Highway Intersections geometric design
- Week Number 6:* Intersections sight distances and safety/ design of roundabout
- Week Number 7:* Roundabout Design
- Week Number 8:* Interchanges and bridge geometric design.
- Week Number 9:* Soil Engineering for Highway Design, California Bearing Ratio Test, Bituminous Material, Common tests, etc.
- Week Number 10:* Bituminous Materials and Asphalt mix design
- Week Number 11:* Marshall Test for asphalt mixtures and design of mix. Traffic load Transformation & Concept of equivalent single Axle load (ESAL)
- Week Number 12:* Rigid vs. Flexible pavement & Design of flexible pavement, Classical Methods. Design of Flexible Pavements, AASHTO method, and Pavement Management.
- Week Number 13:* Highway Linear Scheduling technique and application
- Week Number 14:* Highway Construction & Equipment.

APPENDIX A-180

*Week Number 15:* Pavement Common Distresses, evaluation and repair

*Week Number 16:* Final Exam.

COURSE COORDINATOR AND DEMAND

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*Course Coordinator:* Dr. Akram Soltan Kotb.

*Course Demand:* *Required*