University of Jordan
Civil Engineering Department
Advanced Highway Geometric Design (0901781)

Instructor: Prof. Mohammed Taleb Obaidat
Teaching Assistant: will be announced later
Office: CE Dept.
Office Hours: will be announced in class, or by appointment
Prerequisite:
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Course Description: (*As in the curriculum of JU*)
Highway systems and evaluation; and design criteria. Traffic characteristics, geometric alignment, roadside design; Traffic control and road capacity; highway design elements; Road transverse cross-sections; Design of rural and urban roads; two-way, arterial and express roads. Intersections and interchanges design; contracts and supervision. Design of turning roadways.

Course Objectives:

1. To familiarize students with profession of highway geometric design and its procedures in the field of transportation engineering.
2. To familiarize students to utilize and practice new technologies in the domain of geometric design.
3. To practice research work in the domain of highway geometric design.
4. To master software in highway geometric design.
5. To familiarize students with location, geometrics and design of practical highways and roads through real projects.

Course Outline:

1. The Profession of Transportation Engineering; and Transportation Systems and Organizations	(One week)
2. Traffic Operations "Char. of Driver, pedestrian, vehicle and road"	(One week)
3. Highway Capacity and Level of Service	(One week)
4. Multilane highways	(Half week)
5. Highway functions	(One week)
6. Design controls and criteria	(Five weeks)
- Geometric Alignment and design of highway facilities	
- Horizontal and vertical alignments)	
7. Cross-section elements	(One week)
8. Local roads and streets	(Half week)
9. Collector roads and streets	(Half week)
10. Rural and Urban Arterials	(Half week)
11. Intersections	(One week)
12. Grade separations and interchanges	(Half week)
13. Geometric Alignment and design of highway facilities	(Half week)
14. Computer applications (*Land-development; civil 3D and spread sheets*)	(One week)
15. Highway Projects	(One week)

Text Books:
1. A Policy on Geometric Design of Highway and Streets, 5th or 6th Ed., American Association of State Highway and Transportation Officials (AASHTO), 2004 or 2011.

2. Traffic and Highway Engineering; by N. J. Garber and L. A. Hoel; Fourth edition; Books/Cole; Thomson Learning.

References:

1. Highway Engineering Handbook (3rd Revised edition); Roger L. Brockenbrough.
2. Highway Traffic Analysis and Design by R.J. Salter.
3. The Handbook of Road Safety Measures
   by Rune Elvik , Alena Hoye , Truls Vaa
4. Highway Engineering Handbook: Building and Rehabilitating the Infrastructure
   by Roger L. Brockenbrough
5. Principles of Highway Engineering; Fred L. Mannering
6. Highway Engineering; Martin Rogers
7. A Policy on Geometric Design of Highway and Streets, 5th or 6th Ed., American Association of State Highway and Transportation Officials (AASHTO), 2004 or 2012
8. Geometric Design Projects for Highways: An Introduction, Schoon, J.G.; 2nd Edition, ASCE, Reston, Va., 1999.
9. Roadway Design Manual, Texas Department of Transportation, Austin, Tx, Revised 2006
10. http://onlinemanuals.txdot.gov/txdotmanuals/rdw/rdw.pdf
11. Highway Engineering. Wright, P.H., and Dixon, K. 7th Ed., John Wiley & Sons, Hoboken, N.J., 2004.
12. Highway Design and Traffic Safety Engineering Handbook, Lamm, R., Psarianos, B., and Mailaender, T., McGraw-Hill, New York, New York, 1999.
13. Highway Design Handbook for Older Drivers and Pedestrians. Staplin, L., Lococo, K., Byington, S., and Harkey, D. U.S.DOT/FHWA Publication No. FHWA-RD-01-103. Washington, D.C., 2001.

Journals:

1. TRR (Transportation Research Record).
2. ASCE - transportation division, American Society of Transportation Engineering.
3. ITE Journal- Institute of Transportation Engineers.
4. Canadian Journal of Civil Engineering.
5. *ARRB Road and Transport Research.*
6. Journal of the Transportation Research Forum, JTRF.
7. *Indian Highways of the Indian Roads Congress.*
8. Jordan Journal of Civil Engineering.
9. Journal of Advanced Science and Engineering Research.
10. Engineering Science and Technology, an International Journal
11. Automation in Construction
12. ASTM: Journal of Testing and Evaluation

Course Grading:

1. Midterm exam	20%
2. Projects and Term Papers	25% During Semester + 15% final
4. Quizzes and Home works	5%
5. Final Exam	35%

Projects:
Theme: to give you the courage for research, development, and innovation
They will be assigned from the instructor to each student in advance. Theoretical, analytical and computer work will be involved. Due date will be last week in the course.

Term Papers:
Theme: to give you practice for literature review, new ideas, development and definition of problems associated with this area of research.
The student should consult the instructor about the selection of this topic.

Computer Programming:

I do encourage you to select any programmable material from the course and program it **by yourself**. I have to give you my approval for the selected topic. The theme of out of this is to equip yourself with the programming skills in order to be effective in this time of technology transfer to have your own innovative ideas. So it is pure educational advantage for the student. **Extra five percentages** will be given to this program according to your performance.

Notes for exams and home works:

1. Home works will be given each week and will **not** be collected. They are required to be solved and collected in a special file for every student. Solving them will be good practice for exams. Typical solutions for home works will be given later.
2. There will be quiz at any time of the week.
3. Final exam as well as hourly exams includes both theoretical and practical materials mentioned in class.
4. Tentative schedules for the midterm exam will be in the 9th week.

General Notes:

1. Any late duty will not be accepted.
2. **Cheating is a CRIME and will result in zero grade and applying the university regulations, too.**
3. I do encourage intellectual work not memorization; because of that exam questions will be testing this.