جامعة أم القرى

كلية الهندسة والعمارة الاسلامية

الماجستير في هندسة النقل

4 Learning and Teaching

4.1 Learning Outcomes and Graduate Specifications

4.1.1 Main tracks or specializations covered by the program:

Master's Program in Transportation Engineering
(42 Credit Hours: 36 for courses and 6 for Graduate research project)

First Year			
First Semester			
Code	**Title**	**Credits**	**Prerequisites**
803600-3	Advanced Engineering Mathematics	3	
803641-3	Urban Transportation Planning	3	
803642-3	Highway Design and Materials	3	
803643-3	Transportation Safety & Security	3	
Total		**12**	
Second Semester			
Code	**Title**	**Credits**	**Prerequisites**
803601-3	Advanced Numerical and Statistical Methods	3	803600-3
803644-3	Traffic Management Systems	3	803641-3
803645-3	Public Transit Planning and Design	3	
803646-3	Airport Planning and Design	3	
Total		**12**	
Second Year			
Third Semester			
Code	**Title**	**Credits**	**Prerequisites**
803647-3	Advance Geometric Design	3	803642-3
803648-3	Railway Engineering	3	
803693-6	Graduate Research Project (Two semesters course)	6	
Total		**12**	

Fourth Semester			
Code	**Title**	**Credits**	**Prerequisites**
803691-3	Elective Course	3	
803649-3	Sustainable Transportation and Logistics	3	
Total		**6**	

List of the Proposed Courses

No.		Course ID	Course Tile	Credits	Prerequisites
Core Courses					
Level 1	1	803600-3	Advanced Engineering Mathematics	3	
	2	803641-3	Urban Transportation Planning	3	
	3	803642-3	Highway Design and Materials	3	
	4	803643-3	Transportation Safety & Security	3	
Level 2	5	803601-3	Advanced Numerical and Statistical Methods	3	803600-3
	6	803644-3	Traffic Management Systems	3	803641-3
	7	803645-3	Public Transit Planning & Design	3	
	8	803646-3	Airport Planning and Design	3	
Level 3	9	803647-3	Advance Geometric Design	3	803642-3
	10	803648-3	Railway Engineering	3	
	11	803693-6	Research Project (Two semesters course)	6	Department and Supervisor Approval
Level 4	12	803691-3	Elective courses	3	
	13	803649-3	Sustainable Transportation and Logistics	3	
Elective Courses					
1		803655-3	Special Topics	3	Supervisor Approval
2		803656-3	Design of Asphalt Mixes	3	
3		803657-3	Pavement Management Systems	3	
4		803658-3	GIS and ITS Applications in Transportation	3	

COURSE SPECIFICATIONS
Form

Course Title: **Advanced Engineering Mathematics.**

Course Code: **803600-3.**

Date: 2018-10-19.	**Institution: Umm Al-Qura University**
College: College of Engineering& Islamic Architecture	**Department: Civil Engineering**

A. Course Identification and General Information

1. Course title and code: **Advanced Engineering Mathematics, 803501-3**
2. Credit hours: **3**
3. Program(s) in which the course is offered. **Civil Engineering Department** (If general elective available in many programs indicate this rather than list programs) **Master Program in Transportation Engineering**
4. Name of faculty member responsible for the course: **Dr. Medhat Moustafa Helal**
5. Level/year at which this course is offered: **Level 1 / 1st Year**
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any): **803601-3**
8. Location if not on main campus
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	✓	What percentage? 100
b. Blended (traditional and online)		What percentage?
c. E-learning		What percentage?
d. Correspondence		What percentage?
e. Other		What percent

Comments:

B Objectives

1. The main objective of this course

To develop civil engineer's ability to understand mathematical techniques used in engineering applications.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

- Encourage students to read certain books about some applications of numerical methods.
- Encourage students to use internet to look for related websites, computer software, and references.
- Train students to write and implement computer algorithms for different problems.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

Linear algebra and its applications - Transfers and their applications - Special functions and their applications.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Linear Algebra: Vector spaces, Subspaces, Basis, Dimensions	1	3
Linear transformations, Inverse of matrices, System of equations, Cauchy- Schwarz inequality,	1	3
Orthogonality, Gram-Schmidt orthogonalisation process, Eigenvalue, Eigenvectors, Diagonalisation of matrices.	1	3
Ordinary Differential Equations and Applications: First order differential equations: basic concepts, Exact differential equations	1	3
Linear differential equations, Bernoulli equations. Linear differential equations of second and higher order: Homogeneous and Non homogeneous equations	1	3

Euler- Cauchy Equations, Solution by undetermined coefficients, Solution by variation of parameters.	1	3
Partial Differential Equations: Formation of partial differential equations, Wave equation, Heat conduction equation and Laplace equation.	1	3
Transform Calculus: Laplace Transform and its existence, Inverse Transform, Fourier Transform, Properties of general Fourier Transform	1	3
Concept and properties of Fourier Sine Transform and Fourier Cosine Transform,	1	3
Solution of ordinary differential equations.	1	3
Solution of heat conduction equation, wave equation using Transform techniques.	1	3
Theory of Complex variables: Cauchy Riemann Equations	1	3
Line Integral in the complex plane, Power series & Taylor Series	1	3
Singularity, Laurent' Series, Residues	1	3
Evaluation of Real Integrals	1	3

2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual						
Credit	Planned	3					3
	Actual						

3. Individual study/learning hours expected for students per week. 3

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting

teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	To describe different types of Linear Algebra.	• Introducing the topics in the lectures • Discussions in the class • Homework assignments • Independent study	• Homework assignments • Short exams • Mid-term exams and a final exam
1.2	To define the Ordinary Differential Equations and Applications.		
1.3	To describe the Partial Differential Equations		
1.4	To state the methods of Transform Calculus.		
1.5	To describe the Theory of Complex variables.		
1.6	To describe the evaluation of Real Integrals.		
2.0	**Cognitive Skills**		
2.1	To summarize the different types of Linear Algebra.	• Lectures • Discussions in the lectures • Homework assignments • Independent study	• Follow up homework assignments • Short exams • Discussions with the students in the class • Mid-Term and final exams
2.2	To analyse the different methods of Ordinary Differential Equations and Applications.		
2.3	To write and run algorithms to solve mathematical problems using computers		
2.4	To design numerical methods in solving some mathematical models appearing frequently in the daily life situations		

2.5	To summarize the different types of Transform Calculus and the evaluation of Real Integrals.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	To participate in the discussion and take initiative in asking and answering questions during the lecture.	• The discussion with the students and asking questions during the lecture. • Homework assignments. • Group assignments.	• Instructor's assessment of student's performance through discussions during lectures • Follow up the homework assignments.
3.2	To work individually or in a team		
3.3	To be able to do homework assignments independently.		
4.0	**Communication, Information Technology, Numerical**		
4.1	To write algorithms and solve mathematical problems numerically	• Computer assignments. • Encourage students to train on the available software concerning the course topics.	• Testing of the skills and attributes is through • Follow up the homework assignments and discussing it with students.
4.2	To discuss and compare computational results		
4.3	To use available information technology to access the supporting materials and references.		
5.0	**Psychomotor**		
5.1	Not applicable	Not applicable	Not applicable

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	First Test	6	20 %
2	Computer assignments	Monthly	6 %
3	Quizzes	Monthly	4 %
4	Second Test	12	20 %
5	Final Exam	16 / 17	50 %

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week) • 10 scheduled office hours per week • 5 hours weekly for academic advice through the academic guidance unit in the department.

E Learning Resources

1. List Required Textbooks • Kreyszing, E., Advanced Engineering Mathematics, Eighth edition, John Wiley. • Dennis G. Zill& Michael R. Cullen “Advance Engineering Math”, 2nd Edition, Jones and Bartlett Publisher. • Berder, C. &Orszag, S. “Advanced Mathematical Method for Scientists and Engineers”,McGraw-Hill.
2. List Essential References Materials (Journals, Reports, etc.) • MATLAB Primer, http://www.mathworks.com/help/pdf_doc/matlab/getstart.pdf, © COPYRIGHT 1984–2012 by The MathWorks, Inc. • MATLAB software, http://www.mathworks.com. Purchase a student version or use PCs in the labs.
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc. • Software such as: Basic, Fortran, C. Maple, Mathematica and MATLAB. • Web sites involving computational mathematics.
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software. • A white board & Computer with internet and data show • In order to do the computer assignments one of the following computer software must be available for the student: • Basic, Fortran, Maple, Mathematica, MATLAB

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • Classroom to accommodate 25 students equipped with usual blackboard or smart board. • Computer laboratory equipped with hardware and software.
2. Technology resources (AV, data show, Smart Board, software, etc.) • Computers connected to internet and equipped with required software. • Printers.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

A white board & Computer with internet and data show. Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching Course evaluation by the students at the end of the semester
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Analysing the course evaluation conducted by students at the end of the semester • Observations of the group of faculty teaching the course.
3. Procedures for Teaching Development • Workshops on teaching and learning methods conducted by the deanship of skills development. • Discussing the teaching methods by the group of faculty members teaching the course at the beginning of each semester.
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) Check the marking of a sample of student answer sheets in the final exam by an independent faculty member
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. Reviewing the course contents every five years in coordination with the departments in which the course is offered in their programs.

Name of Course Instructor: Dr. Medhat Moustafa Helal

Signature: _____ **Date Completed:** _____

Program Coordinator:

_____

Signature: _____ **Date Received:**

_____

COURSE SPECIFICATIONS

Form

Course Title: **Advanced Numerical and Statistical Methods**.

Course Code: **803601-3.**

Date: 2018-10-19.	**Institution: Umm Al-Qura University**
College: College of Engineering& Islamic Architecture	**Department: Civil Engineering**

A. Course Identification and General Information

1. Course title and code: **Advanced Numerical and Statistical Methods, 803601-3**
2. Credit hours: **3**
3. Program(s) in which the course is offered. **Civil Engineering Department**

   (If general elective available in many programs indicate this rather than list programs)

   Master Program in Transportation Engineering
4. Name of faculty member responsible for the course: **Dr. Medhat Moustafa Helal**
5. Level/year at which this course is offered: **Level 2 / 1st Year**
6. Pre-requisites for this course (if any): **803600-3**
7. Co-requisites for this course (if any)
8. Location if not on main campus
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	✓	What percentage? 100
b. Blended (traditional and online)		What percentage?
c. E-learning		What percentage?
d. Correspondence		What percentage?
e. Other		What percent

Comments:

B Objectives

1. The main objective of this course

To develop the skills of the civil engineer to use computers to solve engineering analytical equations by using numerical methods and the basics of statistics science and its applications in the fields of engineering

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

- Encourage students to read certain books about some applications of numerical methods.
- Encourage students to use internet to look for related websites, computer software, and references.
- Train students to write and implement computer algorithms for different problems.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

Numbers and their representations - Errors in the calculations – Numerical Methods for solving differential equations of different engineering systems- Data Analysis and Probability Theory, Mathematical Statistics.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Error Analysis: Errors, Absolute errors, Rounding errors, Truncation errors, Inherent Errors.	1	3
Solution of Linear Systems: Gaussian elimination method with pivoting, LU Decomposition methods.	1	3
Algorithm and convergence of Jacobi iterative Method	1	3
Algorithm and convergence of Gauss Seidel Method, Eigenvalue and eigenvector, Power method	1	3
The Solution of Non-Linear Equations: Bisection Method	1	3
Fixed point iterative method, Newton Raphson method	1	3

Secant method, Method of false position, Algorithms and convergence of these methods	1	3
Ordinary Differential Equations: Euler's, Improved Euler's, Modified Euler's methods with error analysis, Runge-Kutta methods with error analysis, Predictor-corrector methods, Finite Difference.	1	3
Interpolation: Lagrange's interpolation, Newton's divided difference interpolation Newton's forward and backward difference interpolation, Central difference interpolation, Hermit interpolation, Spline interpolation, Errors and algorithms of these interpolations.	1	3
Numerical Differentiation: Newton's Forward, Backward and central formulae for numerical differentiation	1	3
Numerical Integration: Rectangular rule, Trapezoidal rule, Simpson rule, Boole's rule, Gaussian quadrature formulae, Newton-Cotes formulae.	1	3
Numerical methods for solving partial differential equations: Finite difference method, Finite element method.	1	3
Statistics: Random vectors, Bivariate distributions, Independence of random variables, conditional expectation	1	3
Distributions of functions of random variables, Random samples, Distribution of sample mean, Law of large numbers, Central limit theorem, Elementary statistical Inference (estimation and hypothesis testing),	1	3
The probability distributions (t, □ and F), Inference from one sample and two samples.	1	3

2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual						
Credit	Planned	3					3
	Actual						

3. Individual study/learning hours expected for students per week.	3

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column.

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	To describe different Error Analysis methods	• Introducing the topics in the lectures • Discussions in the class • Homework assignments • Independent study	• Homework assignments • Short exams • Mid-term exams and a final exam
1.2	To define the Solution of Linear Systems		
1.3	To describe The Solution of Non-Linear Equations		
1.4	To state the methods of Ordinary Differential Equations		
1.5	To describe the Interpolation methods		
1.6	To describe Numerical Differentiation and Integration methods		
1.7	To describe Numerical methods for solving partial differential equations		
1.8	To describe The Statistics and probability distributions.		
2.0	**Cognitive Skills**		
2.1	To summarize the different types of errors.	• Lectures • Discussions in the lectures • Homework assignments • Independent study	• Follow up homework assignments • Short exams • Discussions with the
2.2	To analyse the different methods of solving the linear and non-linear systems of equations.		

2.3	To write and run algorithms to solve mathematical problems using computers		students in the class • Mid-Term and final exams
2.4	To design numerical methods in solving some mathematical models appearing frequently in the daily life situations		
2.5	To summarize the different types of statistics and probability distributions.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	To participate in the discussion and take initiative in asking and answering questions during the lecture.	• The discussion with the students and asking questions during the lecture. • Homework assignments. • Group assignments.	• Instructor's assessment of student's performance through discussions during lectures • Follow up the homework assignments.
3.2	To work individually or in a team		
3.3	To be able to do homework assignments independently.		
4.0	**Communication, Information Technology, Numerical**		
4.1	To write algorithms and solve mathematical problems numerically	• Computer assignments. • Encourage students to train on the available software concerning the course topics.	• Testing of the skills and attributes is through • Follow up the homework assignments and discussing it with students.
4.2	To discuss and compare computational results		
4.3	To use available information technology to access the supporting materials and references.		
5.0	**Psychomotor**		
5.1	Not applicable	Not applicable	Not applicable

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	First Test	6	20 %

2	Computer assignments	Monthly	6 %
3	Quizzes	Monthly	4 %
4	Second Test	12	20 %
5	Final Exam	16 / 17	50 %

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)
   - 10 scheduled office hours per week
   - 5 hours weekly for academic advice through the academic guidance unit in the department.

E Learning Resources

1. List Required Textbooks
   - Parviz, Moin “Fundamentals of Engineering Numerical Analysis”, Cambridge Univ. Press.
   - Ferziger, Joel H. “Numerical Methods for Engineering Applications”, Willy-Inter-science.
   - Terrnce J. Akai “Applied Numerical Methods for Engineers”, John Wiley &Sons.
   - Decovrsey, W. J. "Statistics and Probability for Engineering Applications with Microsoft Excel", Elsevier Science, USA

2. List Essential References Materials (Journals, Reports, etc.)
   - MATLAB Primer, http://www.mathworks.com/help/pdf_doc/matlab/getstart.pdf, © COPYRIGHT 1984–2012 by The MathWorks, Inc.
   - MATLAB software, http://www.mathworks.com. Purchase a student version or use PCs in the labs.

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
   - Software such as: Basic, Fortran, C. Maple, Mathematica and MATLAB.
   - Web sites involving computational mathematics.

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.
   - A white board & Computer with internet and data show
   - In order to do the computer assignments one of the following computer software must be available for the student:
   - Basic, Fortran, Maple, Mathematica, MATLAB

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • Classroom to accommodate 25 students equipped with usual blackboard or smart board. • Computer laboratory equipped with hardware and software.
2. Technology resources (AV, data show, Smart Board, software, etc.) • Computers connected to internet and equipped with required software. • Printers.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) A white board & Computer with internet and data show. Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching Course evaluation by the students at the end of the semester
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Analysing the course evaluation conducted by students at the end of the semester • Observations of the group of faculty teaching the course.
3. Procedures for Teaching Development • Workshops on teaching and learning methods conducted by the deanship of skills development. • Discussing the teaching methods by the group of faculty members teaching the course at the beginning of each semester.
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) Check the marking of a sample of student answer sheets in the final exam by an independent faculty member
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Reviewing the course contents every five years in coordination with the departments in which the course is offered in their programs.

Name of Course Instructor: Dr. Medhat Moustafa Helal

Signature: _____ Date Completed: _____

Program Coordinator:
_____

Signature: _____ Date Received:
_____

COURSE SPECIFICATIONS
Form

Course Title: Urban Transportation Planning

Course Code: 803641

Institution	Date of Report
Umm Al-Qura University	November 18, 2018
College/Department: College of Engineering & Islamic Architecture, Civil Engineering Department	

A. Course Identification and General Information

1. Course title and code Urban Transportation Planning, 803641	
2. Credit hours 3 hours	
3. Program(s) in which the course is offered. Masters in Transportation Engineering	
4. Name of faculty member responsible for the course Dr. Mohammed A. Saif	
5. Level/year at which this course is offered Graduate Level	
6. Pre-requisites for this course (if any) -	
7. Co-requisites for this course (if any) -	
8. Location if not on main campus Not Applicable	
9. Mode of Instruction (mark all that apply)	
a. Traditional classroom	✓ What percentage? 100

b. Blended (traditional and online) ☐ What percentage? ☐

c. E-learning ☐ What percentage? ☐

d. Correspondence ☐ What percentage? ☐

e. Other ☐ What percer ☐

Comments:

B Objectives

1. What is the main purpose for this course? The main purpose of this course is: • To enable the civil engineering student gain the knowledge related to transportation planning. • To help students develop their abilities in transportation planning and traffic engineering using both basic principles and modern engineering tools
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) • Increasing the number of computers. • E- learning • Increased use of IT or web based reference material, • Changes in content as a result of new research in the field

C. Course Description: The course encompasses mainly planning process, planning elements, data collection techniques, demand management options, land management and traffic analysis studies, modeling and simulations and sustainable urban planning.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Introduction to the Course	0.67	2
Transportation Planning Process	1	3
Elements of Transportation Planning	1	3
Plans and Project Evaluation	1	3
Data Collection Techniques, Surveys, Analysis and Modeling	1.33	4

Demand Management Techniques	1.33	4
Land Use Studies, Digital Elevation Model and Alignment Selection	1.33	4
Transportation Modeling and Demand Assessment	1.33	4
Traffic Impact Studies & Analysis	1.33	4
Sustainable Urban Planning and Traffic Surveys	1.33	4
Engineering Economics Analysis	0.67	2
Evaluation Transportation Alternatives	1	3
Use of ITS and GIS in Transportation Planning	1.33	4
Tutorial, Exams, etc	1.33	4

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	48	-	-	-	-	48
Credit	3	-	-	-	-	3

3. Additional private study/learning hours expected for students per week: 5

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

Course Learning Outcomes, Assessment Methods, and Teaching Strategy work together and are aligned. They are joined together as one, coherent, unity that collectively articulate a consistent agreement between student learning, assessment, and teaching.

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	To enable the civil engineering student gain the knowledge related to transportation planning.	• Through lectures, module notes, tutorials, coursework and examinations. • Through group project work requiring detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular topic for their Individual Project requiring a multi-disciplinary approach	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations • Project report(s), oral examination and writing of a journal-style paper
1.2	To help students develop their abilities to transportation planning and traffic engineering using both basic principles and modern engineering tools		
2.0	**Cognitive Skills**		
2.1	To increase the ability to undertake transportation planning using both basic principles and modern engineering tools.	• Through lectures, module notes, tutorials, coursework and examinations. • Through group project work that will require detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular topic in the compulsory Individual Project module requiring a multi-disciplinary approach	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations • Project report(s), oral examination and writing of a journal-style paper
2.2	To formulate relevant analysis and to derive the solutions for them.		
3.0	**Interpersonal Skills & Responsibility**		

3.1	Increasing the ability to understand transportation planning and traffic engineering.	• Through lectures, tutorials, coursework and group project work. • Through supervised laboratory exercises following standard procedures • Through supervised outdoor practical work • Through supervised computer based laboratory exercises	• Assessed out of class and in-class coursework. (Laboratory and fieldwork reports, modelling calculations) • Project reports and peer review of individual contributions to group work • Observation by tutors during laboratory and fieldwork activities
3.2	Overcoming the problems of transportation planning and traffic engineering.		
3.3	Preparing our graduates for immediate employment in any primary branch of civil engineering.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Developing the sensitivity of the students to sustainable transportation planning and traffic engineering.	• Through lectures, module notes, tutorials, coursework, examinations and group project work. • Through detailed research and analysis of a particular topic in the compulsory Individual Project module requiring a multi-disciplinary approach • Through supervised laboratory exercises following standard procedures • Through supervised field work	• Assessed out of class and in-class coursework. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations and literature review. • Written examinations • Project reports, oral and writing of a journal-style paper • Peer review of individual contributions to group work
4.2	Developing the ability of students to do transportation planning and traffic engineering studies using both basic principles and modern engineering tools.		
4.3	Preparing our graduates to work effectively in modes ranging from independent study to multi-disciplinary teams.		

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework	Bi-weekly	10%
2	Quizzes	Bi-weekly	15%
3	Term Project	Weeks 4-12	10%

4	Mid Semester Examination	Week 8	25 %
5	Final Examination	Week 17	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- All faculty has allocated tutorial or consultation hours during which the concerned teaching staff is available to provide academic advising to students.
- Generally, five hours are allocated per week and displayed outside office of the concerned teaching staff to facilitate advising to the students.

E. Learning Resources

1. List Required Textbooks

- C.S Papacostas, P.D. Prevedouros, “Transportation Engineering and Planning”, 3rd Edition, Prentice Hall, Inc., Englewood Cliffs, New Jersey, 2001.
- Pratibha Deshmukh, “Urban Transportation Planning and Management”, SBS Publishers, New Delhi. 2010.

2. List Essential References Materials (Journals, Reports, etc.)

- .H. Wright and K.K. Dixon "Transportation Engineering" 7th Edition, John Wiley & Sons, Inc, .. 2010.
- C. Jotin, Khisty, B. Kent Lall, “Transportation Engineering”, 3rd Edition, Prentice Hall, Englewood Cliffs, NJ 07632, 2003.
- U.S. Department of Transportation and Federal Highway Administration, "Flexibility in Highway Design", New Jersey, Washington D.C., 20590, 2012.
  Peter P. Rogers, et Al, “An Introduction to Sustainable Development” PHI Publishers, New Delhi, 2008.

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

- TxDOT Transportation Planning Manual
- USDOTA Guide to Transportation Decision Making

4. List Electronic Materials(eg. Web Sites, Social Media, Blackboard, etc.) • http://www.sciencedirect.com. • http://www.trb.org/Main/Home.aspx
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. • Latest Transportation Planning Software

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Classroom for about 40 students, with white board, computer, projector and internet. **Library:** The University Library provides advanced support for student learning in a purpose-built building and electronically via the web. It is open for upwards of 80 hours per week during semester and holds a stock of more than half a million volumes and an extensive serials collection. Numerous PC workstations (100+), networked printing facilities and self-service photocopiers are also available. The Library catalogue is available on-line, as are electronic versions of reading lists. Over 180 subject-specific electronic databases can be accessed by users both on campus and elsewhere. The Library organizes induction sessions for first year students and librarians can provide flexible training for students and researchers throughout their time. User support is also available from the Library information desks, via printed and online guides and through a series of 'Lunchtime in the Library' and other training sessions. There are a variety of study environments in the Library, including individual and group study desks and group study rooms. **Engineering Education Centre:**

The Engineering Education Centre supports the implementation of innovative Teaching and Learning Methods into the curriculum, within the Faculty of Engineering, via the use of appropriate technologies. The Centre provides a focus for computer based learning and teaching activities in the Engineering Faculty, unlimited advice on Computer aided learning/assessment and distance learning materials, a limited amount of free software development time, and help to secure funding and manage projects relevant to learning and teaching.

Counselling Service and English Language Study Unit:

The Counselling Service and English Language Study Unit are able to support individual students in resolving problems and in improving communication skills for international students.

2. Computing resources (AV, data show, Smart Board, software, etc.)

Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

A white board & Computer with internet and data show.

Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Student questionnaire at the end of the semester.
- Student test result analysis.
- Regular feedback from students.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

- Regular review of the course contents by the related department committee.
- Input from visiting professors.

3 Processes for Improvement of Teaching

- Regular updating of learning resources.
- Usage of new technologies in presenting the course materials.
- Self-learning.
- Promote reading of outside materials.
- Encouraging students to conduct scientific presentations and group discussions.
- Additional training for the staff assist.

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- Check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution
- A review of a sample of student answers by a related department committee.
- In-department group review and marking.
- External reviewer for a sample of student answering sheets.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Regular updating of learning resources.
- Usage of new technologies in presenting the course materials.
- Regular review of the course content by the related department committee.
- Input from external and internal reviewers.

Faculty or Teaching Staff: Dr. Hasan Tayyeb

Signature: _____ Date Report Completed: _____

Received by: _____ Dean/Department Head

Signature: _____ Date: _____

COURSE SPECIFICATIONS
Form

Course Title: Highway Design and Materials

Course Code: 803642-3

Institution	Date of Report
Umm Al-Qura University	November 18, 2018
College/Department: College of Engineering & Islamic Architecture, Civil Engineering Department	

A. Course Identification and General Information

1. Course title and code Highway Design and Materials, 803642
2. Credit hours 3 hours
3. Program(s) in which the course is offered. Master's in Transportation Engineering
4. Name of faculty member responsible for the course

Prof. Dr. Imtiaz Ahmed Said Ahmed
5. Level/year at which this course is offered Graduate Level
6. Pre-requisites for this course (if any) -
7. Co-requisites for this course (if any) -
8. Location if not on main campus Not Applicable
9. Mode of Instruction (mark all that apply) a. Traditional classroom ✓ What percentage? 100 b. Blended (traditional and online) What percentage? c. E-learning What percentage? d. Correspondence What percentage? e. Other What percer Comments:

B Objectives

1. What is the main purpose for this course?

   The main purpose of this course is:

   - To understand highway design controls, criteria, standards, considerations for cross section elements and highway geometrics
   - To understand highway pavement design methodologies, AASHTO flexible pavement design procedures and Mechanistic - Empirical pavement design, including use of software.
   - To understand modern pavement design concepts and tools, including characterization of pavement materials and environmental effects on pavements.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

   - Increasing the number of computers.
   - E- learning
   - Increased use of IT or web based reference material,
   - Changes in content as a result of new research in the field

C. Course Description:

The course encompasses highways design controls and criteria, current design practices, AASHTO design procedures, mechanistic - empirical pavement design, use of GIS, and other innovative techniques, impact of climate change on highway drainage and sustainability aspects.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Introduction to the Course	0.67	2

Highway Classifications and its Significance in Multimodal Context	0.67	2
Highway Design Controls, Criteria and Standards	1	3
Design Considerations for Cross Section Elements	1	3
Design of Horizontal Roadway Alignment, including learning use of software to optimize design	1.33	4
Digital Elevation Modal and Design of Vertical Roadway Alignment	1.33	4
Types of Highway Crossings and Design of At-Grade Intersections	1	3
AASHTO Flexible Pavement Design Procedures under different topography and environments	2	6
Mechanistic-Empirical Pavement Design	0.67	2
Modern Pavement Design Concepts and Tools	0.67	2
Characterization of Pavement Materials and Asphalt Mix Design	1.33	4
Sustainability of Pavements under Climate Change Scenario	1.33	4
Economic Analysis of Highway Projects	1	3
Use of ITS and GIS in Highway Design	0.67	2
Tutorial, Exams, etc.	1.33	4

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	48	-	-	-	-	48
Credit	3	-	-	-	-	3

3. Additional private study/learning hours expected for students per week	5

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

Course Learning Outcomes, Assessment Methods, and Teaching Strategy work together and are aligned. They are joined together as one, coherent, unity that collectively articulate a consistent agreement between student learning, assessment, and teaching.

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	To understand highway design controls and criteria, considerations for cross section elements and highway geometrics	• Through lectures, module notes, tutorials, coursework and examinations. • Through group project work requiring detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular topic for their Individual Project requiring a multi-disciplinary approach	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations • Project report(s), oral examination and writing of a journal-style paper
1.2	To understand basic concepts of highway pavement design methodologies, AASHTO flexible pavement design procedures and fundamentals of Mechanistic - Empirical pavement design.		
1.3	To understand modern pavement design concepts and tools, including characterization of pavement materials and environmental effects on pavements		

2.0	**Cognitive Skills**		
2.1	To increase the ability to select highway design controls and criteria, considerations for cross section elements and highway geometrics	• Through lectures, module notes, tutorials, coursework and examinations. • Through group project work that will require detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular topic in the compulsory Individual Project module requiring a multi-disciplinary approach	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations • Project report(s), oral examination and writing of a journal-style paper
2.2	To prepare the students to undertake AASHTO flexible pavement design procedures and fundamentals of Mechanistic - Empirical pavement design using both basic principles and modern engineering tools.		
2.3	To increase the ability of students to apply modern pavement design concepts and tools, including characterization of pavement materials and environmental effects on pavements		
2.4	To formulate relevant analysis and to derive the solutions for them.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Increasing the ability to understand transportation planning and traffic engineering.	• Through lectures, tutorials, coursework and group project work. • Through supervised laboratory exercises following standard procedures	• Assessed out of class and in-class coursework. (Laboratory and fieldwork reports, modelling calculations) • Project reports and peer review of individual contributions to group work
3.2	Overcoming the problems of transportation planning and traffic engineering.		

3.3	Preparing our graduates for immediate employment in any primary branch of civil engineering.	• Through supervised outdoor practical work • Through supervised computer based laboratory exercises	• Observation by tutors during laboratory and fieldwork activities.
4.0	**Communication, Information Technology, Numerical**		
4.1	Developing the sensitivity of the students to transportation planning and traffic engineering.	• Through lectures, module notes, tutorials, coursework, examinations and group project work. • Through detailed research and analysis of a particular topic in the compulsory Individual Project module requiring a multi-disciplinary approach • Through supervised laboratory exercises following standard procedures • Through supervised field work.	• Assessed out of class and in-class coursework. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations and literature review. • Written examinations • Project reports, oral and writing of a journal-style paper • Peer review of individual contributions to group work
4.2	Developing the ability of students to do transportation planning and traffic engineering studies using both basic principles and modern engineering tools.		
4.3	Preparing our graduates to work effectively in modes ranging from independent study to multi-disciplinary teams.		
5.0	**Psychomotor**		

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework	Bi-weekly	10%
2	Quizzes	Bi-weekly	10%
3	Term Project	Weeks 4-12	15%
4	Midterm Exam	Week 8	25 %
5	Final Exam	Week 17	40%

6			
7			

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- All faculty has allocated tutorial or consultation hours during which the concerned teaching staff is available to provide academic advising to students.
- Generally, five hours are allocated per week and displayed outside office of the concerned teaching staff to facilitate advising to the students.

E. Learning Resources

1. List Required Textbooks

- A.T. Papagiannakis and E.A. Masad, "Pavement Design and Materials" Ist Edition, John Wiley & Sons, Inc., 2008.

2. List Essential References Materials (Journals, Reports, etc.)

- Y. H. Huang, “Pavement Analysis and Design”, Pearsons, 2012.
- Nicholas J. Garber and Lester A. Hoel, Traffic and Highway Engineering, 4th Edition, 2010, Cengage Learning, USA.
- U.S. Department of Transportation and Federal Highway Administration, "Flexibility in Highway Design", New Jersey, Washington D.C., 20590, 2012.

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

- Highway Design Manual, Ministry of Transport, KSA.
- AASHTO - Guide for Design of Pavement Structures. USA
- AASHTO - Mechanistic-Empirical Pavement Design Guide: A Manual of Practice, 2nd Edition
- AASHTO - Pavement Design, Construction, and Management: A Digital Handbook, 1st Edition

4. List Electronic Materials(eg. Web Sites, Social Media, Blackboard, etc.)

- http://www.sciencedirect.com.
- http://www.trb.org/Main/Home.aspx

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. • Latest Highway Design Software

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Classroom for about 40 students, with white board, computer, projector and internet. **Library:** The University Library provides advanced support for student learning in a purpose-built building and electronically via the web. It is open for upwards of 80 hours per week during semester and holds a stock of more than half a million volumes and an extensive serials collection. Numerous PC workstations (100+), networked printing facilities and self-service photocopiers are also available. The Library catalogue is available on-line, as are electronic versions of reading lists. Over 180 subject-specific electronic databases can be accessed by users both on campus and elsewhere. The Library organizes induction sessions for first year students and librarians can provide flexible training for students and researchers throughout their time. User support is also available from the Library information desks, via printed and online guides and through a series of 'Lunchtime in the Library' and other training sessions. There are a variety of study environments in the Library, including individual and group study desks and group study rooms. **Engineering Education Centre:** The Engineering Education Centre supports the implementation of innovative Teaching and Learning Methods into the curriculum, within the Faculty of Engineering, via the use of appropriate technologies. The Centre provides a focus for computer based learning and teaching activities in the Engineering Faculty, unlimited advice on Computer aided learning/assessment and distance learning materials, a limited amount of free software

development time, and help to secure funding and manage projects relevant to learning and teaching.

Counselling Service and English Language Study Unit:

The Counselling Service and English Language Study Unit are able to support individual students in resolving problems and in improving communication skills for international students.

2. Computing resources (AV, data show, Smart Board, software, etc.)

Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

A white board & Computer with internet and data show.

Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Student questionnaire at the end of the semester.
- Student test result analysis.
- Regular feedback from students.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

- Regular review of the course contents by the related department committee.
- Input from visiting professors.

3 Processes for Improvement of Teaching

- Regular updating of learning resources.
- Usage of new technologies in presenting the course materials.
- Self-learning.
- Promote reading of outside materials.
- Encouraging students to conduct scientific presentations and group discussions.
- Additional training for the staff assist.

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- Check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution
- A review of a sample of student answers by a related department committee.
- In-department group review and marking.
- External reviewer for a sample of student answering sheets.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Regular updating of learning resources.
- Usage of new technologies in presenting the course materials.
- Regular review of the course content by the related department committee.
- Input from external and internal reviewers.

Faculty or Teaching Staff: Dr. Imtiaz Ahmad

Signature: _____ **Date Report Completed:** _____

Received by: _____ **Dean/Department Head**

Signature: _____ **Date:** _____

COURSE SPECIFICATIONS
Form

Course Title: Transportation Safety & Security

Course Code: 803643-3

Date: 2018-١١-١١	**Institution:** Umm Al Qura University
College: College Of Engineering And Islamic Architecture **Department:** Civil Engineering	

A. Course Identification and General Information

1. Course title and code: Transportation Safety & Security 803643-3
2. Credit hours: 3 hrs.
3. Program(s) in which the course is offered. Civil & Transportation Engineering
4. Name of faculty member responsible for the course Dr. Hasan Tayyeb
5. Level/year at which this course is offered: Masters
6. Pre-requisites for this course (if any): Transportation Planning
7. Co-requisites for this course (if any): -
8. Location if not on main campus: -
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percenta ١٠٠
b. Blended (traditional and online)		percentage
c. E-learning		percen
d. Correspondence		percent
f. Other		percer

Comments:

B Objectives

1. To help in the preparation of Transportation Safety and Security plans
2. To contribute to the design of Transportation safety & Security schemes
3. To evaluate schemes by cost/benefit analysis
4. To contribute to educational and publicity material relating to Transportation safety

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description: Transportation safety and Security is a multidisciplinary and multivariate engineering field, where every proposed action and measure should be developed and supported through strategies in the areas of engineering, enforcement, education and emergency medical services, taking into consideration social and economic aspects as well. However tools do not create the transportation safety and security future, trained professionals do. This course is the mean to communicate the necessary insights and knowledge within the constantly evolving environment of Transportation safety and security.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Introduction of Transportation Safety & Security	1	3
Basic concepts of Transportation Safety and Security	2	6
Transportation Safety Management	1	3
Collection and Analysis of crash data	2	6
Contributing crash factors, countermeasure selection and evaluation	2	6
Transportation safety policies and plans	2	6
Transportation Infrastructure Safety Management	2	6
Project Presentation	2	6

2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory / Studio	Practical	Other	Total
Contact Hours	Planned	42	0				42
	Actual	42	0				42
Credit	Planned	3					3
	Actual	3	100%				3

3. Individual study/learning hours expected for students per week. 5

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Conceptual Aspects of Transportation Safety and Security	In class	reports, and presentations
1.2	Transportation Safety Management	In class	reports
2.0	**Cognitive Skills**		
2.1	Collection and Analysis of crash data	In class & filed	reports, and projects,
2.2	Contributing crash factors, countermeasure selection and evaluation	In class	presentations and quizzes
3.0	**Interpersonal Skills & Responsibility**		
3.1	Project Presentation	In class	Reports
3.2			presentations and quizzes
4.0	**Communication, Information Technology, Numerical**		
4.1	Transportation safety policies and plans	Fields	projects,
4.2			
5.0	**Psychomotor(if any)**		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Assignment	3, 5, 7, 12	10 %
2	Case Study and Presentation	10	15 %
3	Midterm	7	20 %
4	Final Exam	15	50 %
5	Attendance	15	5%
6			

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week) 20 hrs.

E Learning Resources

1. List Required Textbooks Urban Transportation Planning, by Michael Meyer, Eric Miller, McGraw Hill Urban Transit Systems and Technology John Wiley and Sons Transit Capacity and Quality of Service Manual, 2nd Edition, Transportation Research Board
2. List Essential References Materials (Journals, Reports, etc.)
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) 20
2. Technology resources (AV, data show, Smart Board, software, etc.) Multimedia projector, Laptop, whiteboard and printer
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
3. Procedures for Teaching Development
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: Dr. Hasan Tayyeb

Signature: _____ Date Completed: _____

Program Coordinator: _____

Signature: _____ Date Received: _____

COURSE SPECIFICATIONS
Form

Course Title: Traffic Management Systems

Course Code: 803644-3

Institution	Date of Report
Umm Al-Qura University	November 18, 2018
College/Department: College of Engineering & Islamic Architecture, Civil Engineering Department	

A. Course Identification and General Information

1. Course title and code Traffic Management Systems, 803644	
2. Credit hours 3 hours	
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Masters in Transportation Engineering	
4. Name of faculty member responsible for the course Prof. Dr. Mohammed A. Saif	
5. Level/year at which this course is offered Graduate Level	
6. Pre-requisites for this course (if any) Urban Transportation Planning (803641-3)	
7. Co-requisites for this course (if any) -	
8. Location if not on main campus Not Applicable	
9. Mode of Instruction (mark all that apply)	
f. Traditional classroom	✓ What percentage? 100

g. Blended (traditional and online)	☐	What percentage? ☐
h. E-learning	☐	What percentage? ☐
i. Correspondence	☐	What percentage? ☐
j. Other	☐	What percer ☐

Comments:

B Objectives

1. What is the main purpose for this course?

   The main purpose of this course is:

   - Learn about the characteristics of Traffic Streams
   - Undertake capacity analysis under varying traffic operating conditions.
   - Acquire basic knowledge about traffic control measures and traffic management tools.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

   - Increasing the number of computers.
   - E- learning
   - Increased use of IT or web based reference material,
   - Changes in content as a result of new research in the field

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
Introduction to thecCourse	0.67	2
Traffic stream elements and characteristics	1.33	4
Traffic volume studies and analysis	1.33	4
Speed Travel time, density and delay studies	1	3
Accident studies and safety audit	1	3
Highway traffic capacity concepts and analysis	1	3
Areas of concentrated turbulence on highways	1	3
Calibrating relationships for freeways	1	3
Analysis of freeways and multilane highways	1	3
Traffic Demand Management Strategies	1	3
Intersection signalization & capacity analysis	1	3
Optimizing signal design and timing	1	3
Techniques for addressing freeway system congestion	1	3
Use of software and modern tools for Traffic Analysis	1.33	4
Tutorial, Exams, etc.	1.33	4

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	48	-	-	-	-	48
Credit	3	-	-	-	-	3

3. Additional private study/learning hours expected for students per week. 5

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Learn about the characteristics of Traffic Streams	• Through lectures, module notes, tutorials, coursework and examinations. • Through group project work requiring detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular topic for their Individual Project requiring a multi-disciplinary approach	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations • Project report(s), oral examination and writing of a journal-style paper
1.2	Undertake capacity analysis under varying traffic operating conditions.		
1.3	Acquire basic knowledge about traffic control measures and traffic management tools.		
2.0	**Cognitive Skills**		

2.1	To increase the ability to calculate traffic stream characteristics and undertake capacity analysis under varying traffic operating conditions using both basic principles and modern engineering tools.	• Through lectures, module notes, tutorials, coursework and examinations. • Through group project work that will require detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular topic in the compulsory Individual Project module requiring a multi-disciplinary approach.	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations • Project report(s), oral examination and writing of a journal-style paper
2.2	To increase the ability towards improvement of traffic control measures and traffic management.		
2.3	To formulate relevant analysis and to derive the solutions for them.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Increasing the ability to understand transportation planning and traffic engineering.	• Through lectures, tutorials, coursework and group project work. • Through supervised laboratory exercises following standard procedures • Through supervised outdoor practical work • Through supervised computer based laboratory exercises.	• Assessed out of class and in-class coursework. (Laboratory and fieldwork reports, modelling calculations) • Project reports and peer review of individual contributions to group work • Observation by tutors during laboratory and fieldwork activities
3.2	Overcoming the problems of transportation planning and traffic engineering.		
3.3	Preparing our graduates for immediate employment in any primary branch of civil engineering.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Developing the sensitivity of the students to transportation planning and traffic engineering.	• Through lectures, module notes, tutorials, coursework, examinations and group project work. • Through detailed research and analysis of a particular topic in the compulsory Individual Project module	• Assessed out of class and in-class coursework. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations and literature review.
4.2	Developing the ability of students to do transportation planning and traffic engineering studies using both basic		

	principles and modern engineering tools.	requiring a multi-disciplinary approach • Through supervised laboratory exercises following standard procedures • Through supervised field work.	• Written examinations • Project reports, oral and writing of a journal-style paper • Peer review of individual contributions to group work
4.3	Preparing our graduates to work effectively in modes ranging from independent study to multi-disciplinary teams.		
5.0	**Psychomotor**		

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework	Bi-weekly	10%
2	Quizzes	Bi-weekly	15%
3	Term Project	Weeks 6-8	10%
4	Midterm Exam	Week 8	25%
5	Final Exam	Week 17	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- All faculty has allocated tutorial or consultation hours during which the concerned teaching staff is available to provide academic advising to students.
- Generally, five hours are allocated per week and displayed outside office of the concerned teaching staff to facilitate advising to the students.

E. Learning Resources

1. List Required Textbooks • W.R. McShane, R.P. Roses, “Traffic Engineering”, 3rd Edition, Prentice Hall, Englewood, Cliffs, New Jersey, 2010
2. List Essential References Materials (Journals, Reports, etc.) • Nicholas A. Garber & Lester A. Hoel, “Traffic and Highway Engineering”, Cengage Learning, USA, 2010. • F.L. Mannering, S.S. Washburn and W.P. Kilareski, "Principles of Highway Engineering and Traffic Analysis" 4th Edition, John Wiley & Sons, Washington D.C, 2009. • J.H. Banks, "Introduction to Transportation Engineering" 2nd Edition, McGraw Hills, New York, 2010 • Transportation Research Board, “Highway Capacity Manual”, National Research council, Washington, D.C., 2009.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • AASHTO - Guide for High-Occupancy Vehicle (HOV) Facilities, 3rd Edition
4. List Electronic Materials(eg. Web Sites, Social Media, Blackboard, etc.) • http://www.sciencedirect.com. • http://www.trb.org/Main/Home.aspx
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. • Latest Traffic Engineering Software

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Classroom for about 40 students, with white board, computer, projector and internet.

Library:

The University Library provides advanced support for student learning in a purpose-built building and electronically via the web. It is open for upwards of 80 hours per week during semester and holds a stock of more than half a million volumes and an extensive serials collection. Numerous PC workstations (100+), networked printing facilities and self-service photocopiers are also available. The Library catalogue is available on-line, as are electronic versions of reading lists. Over 180 subject-specific electronic databases can be accessed by users both on campus and elsewhere. The Library organizes induction sessions for first year students and librarians can provide flexible training for students and researchers throughout their time. User support is also available from the Library information desks, via printed and online guides and through a series of 'Lunchtime in the Library' and other training sessions. There are a variety of study environments in the Library, including individual and group study desks and group study rooms.

Engineering Education Centre:

The Engineering Education Centre supports the implementation of innovative Teaching and Learning Methods into the curriculum, within the Faculty of Engineering, via the use of appropriate technologies. The Centre provides a focus for computer based learning and teaching activities in the Engineering Faculty, unlimited advice on Computer aided learning/assessment and distance learning materials, a limited amount of free software development time, and help to secure funding and manage projects relevant to learning and teaching.

Counselling Service and English Language Study Unit:

The Counselling Service and English Language Study Unit are able to support individual students in resolving problems and in improving communication skills for international students.

2. Computing resources (AV, data show, Smart Board, software, etc.)

Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The

University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) A white board & Computer with internet and data show. Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching • The Faculty must has an Associate Dean for Teaching responsible for all learning and teaching matters. For each Faculty there is a Directorate (responsible for the allocation of resources) and a Board (responsible for monitoring quality issues within each department). Support is provided by Professional Development. Student feedback on modules and program is sought at regular intervals, individual program are reviewed annually, and Departments review their full portfolio of programmers as part of a Periodic Program Review (every five years). • Minor changes to module specifications are approved by the Associate Dean (Teaching) on behalf of the Faculty Board, and ratified by the University Curriculum Sub-Committee in accordance with the University's quality procedures. Major changes are formally considered by the University Curriculum Sub-Committee. • All staff participate in the University's staff appraisal scheme, which helps to identify any needs for staff skills development. Both probationary staff and those seeking promotion to Senior Lecturer are subject to a formal teaching evaluation scheme.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • New lecturers attend a personalized programme of courses and, in the final year of probation, they assess their teaching through direct observation and a portfolio. • Professional Development works directly with staff who wish to develop more effective teaching and learning methods - including the area of learning technologies - and provides resources to support the learning skills development of students. • Other development opportunities are provided in institutional strategic priority areas and in response to discussions with departments in the context of their needs.

- Lectures
- Tutorial
- Survey Lab
- Class Activity

3 Processes for Improvement of Teaching

- Increasing the number of computers.
- E- learning
- Field applications must be completed
- Additional training for the staff assist.
- Scanning electron microscope.
- Multi-media facility (video projector, TV, etc.,).

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- Check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Shortage of computer systems and modern lab facilities must be solved
- Unavailability of technical staff must be solved
- Time is not enough must be solved
- Too many topics must be solved
- In-adequate experimental setup must be solved

Faculty or Teaching Staff: Dr. amaohammed Saif

Signature: _____ **Date Report Completed:** _____

Received by: _____ **Dean/Department Head**

Signature: _____ **Date:** _____

ATTACHMENT 2 (e)

Course Specifications

COURSE SPECIFICATIONS
Form

Course Title: Public Transit Planning and Design

Course Code: 803645-3

Institution	Date of Report
Umm Al-Qura University	November 18, 2018
College/Department: College of Engineering & Islamic Architecture, Civil Engineering Department	

A. Course Identification and General Information

1. Course title and code	Public Transit Planning and Design, 803645
2. Credit hours	3 hours
3. Program(s) in which the course is offered.	Masters in Transportation Engineering
4. Name of faculty member responsible for the course	Prof. Dr. Imtiaz Ahmed Said Ahmed
5. Level/year at which this course is offered	Graduate Level
6. Pre-requisites for this course (if any)	-
7. Co-requisites for this course (if any)	-
8. Location if not on main campus	Not Applicable
9. Mode of Instruction (mark all that apply)	
k. Traditional classroom	✓ What percentage? 100

l. Blended (traditional and online)	☐	What percentage? ☐
m. E-learning	☐	What percentage? ☐
n. Correspondence	☐	What percentage? ☐
o. Other	☐	What percer ☐

Comments:

B Objectives

1. What is the main purpose for this course?

The main purpose of this course is:

- Acquire knowledge about planning, design and construction of public transportation system.
- Acquire expertise about efficient operation and management of public transportation system, including use relevant software
- Learn about maintenance of public transportation system.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

- Increasing the number of computers.
- E- learning
- Increased use of IT or web based reference material,
- Changes in content as a result of new research in the field

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Introduction to the Course	0.67	2
Background to Multimodal Transportation	0.67	2
Modal Characteristics and Classifications	0.67	2
Sustainable Urban Transportation Planning	1.33	4
Short Range Transit	1	3
Urban Development and Emerging Needs of Public Transit	1	3
Data Collection and Optimizing Public Transit Modes	0.67	2
Vehicle Scheduling	0.67	2
Bus Corridor Service	1.33	4
Use of ITS and GIS in Public Transit	1.33	4
Ridership Prediction	0.67	2
Optimizing Transit Operations	0.67	2
Public Transit in KSA	0.67	2
Public Transit Plans, Projects and Evaluation	0.67	2
Mobility: New Perspectives on Transport and Society	1.33	4
Sustainability of Urban Mass Transportation Systems	0.67	2
Modern Trends in Public Transit	0.67	2
Tutorials/ Revision/ Exams	1.33	4

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact	48	-	-	-	-	48

Hours						
Credit	3	-	-	-	-	3

3. Additional private study/learning hours expected for students per week 5

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Acquire knowledge about fundamentals of planning, design and construction of public transportation system.	• Through lectures, module notes, tutorials, coursework and examinations. • Through group project work requiring detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular topic for their Individual Project requiring a multi-disciplinary approach	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations • Project report(s), oral examination and writing of a journal-style paper
1.2	Acquire expertise about efficient operation and management of public transportation system.		
1.3	Learn about maintenance of public transportation system.		
2.0	**Cognitive Skills**		
2.1	To increase the ability to plan, design and construct public transportation system.	• Through lectures, module notes, tutorials, coursework and examinations.	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and

2.2	To increase the ability to undertake efficient operation and management of public transportation system.	• Through group project work that will require detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular topic in the compulsory Individual Project module requiring a multi-disciplinary approach	fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations • Project report(s), oral examination and writing of a journal-style paper
2.3	To increase the abilities of students w.r.t. maintenance of public transportation system.		
2.4	To prepare the students to design public transportationsystems using both basic principles and modern engineering tools.		
2.5	To formulate relevant analysis and to derive the solutions for them.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Increasing the ability to understand public transportation.	• Through lectures, tutorials, coursework and group project work. • Through supervised laboratory exercises following standard procedures • Through supervised outdoor practical work • Through supervised computer based laboratory exercises	• Assessed out of class and in-class coursework. (Laboratory and fieldwork reports, modelling calculations) • Project reports and peer review of individual contributions to group work • Observation by tutors during laboratory and fieldwork activities
3.2	Overcoming the problems of public transportation		
3.3	Preparing our graduates for immediate employment in any primary branch of civil engineering.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Developing the sensitivity of the students to public transportation	• Through lectures, module notes, tutorials, coursework, examinations and group project work.	• Assessed out of class and in-class coursework. Course works may be in the form of: laboratory and fieldwork reports, essays,
4.2	Developing the ability of students to do public		

	transportation planning studies using both basic principles and modern engineering tools.	• Through detailed research and analysis of a particular topic in the compulsory Individual Project module requiring a multi-disciplinary approach • Through supervised laboratory exercises following standard procedures • Through supervised field work	in-class tests, design calculations and literature review. • Written examinations • Project reports, oral and writing of a journal-style paper • Peer review of individual contributions to group work
4.3	Preparing our graduates to work effectively in modes ranging from independent study to multi-disciplinary teams.		
5.0	**Psychomotor**		

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework	Bi-weekly	10%
2	Quizzes	Bi-weekly	10%
3	Term Project	Weeks 6-8	15%
4	Midterm Exam	Week 8	25%
5	Final Exam	Week 17	40%
6			
7			
8			

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

• All faculty has allocated tutorial or consultation hours during which the concerned teaching staff is available to provide academic advising to students. • Generally, five hours are allocated per week and displayed outside office of the concerned teaching staff to facilitate advising to the students.

E. Learning Resources

1. List Required Textbooks • A. Ceder, "Public Transport Planning and Operation: Theory, Modeling and Practice" Ist Edition, Elsevier Ltd, MA, 2007.
2. List Essential References Materials (Journals, Reports, etc.) • C. Jotin, Khisty, B. Kent Lall, “Transportation Engineering”, 3rd Edition, Prentice Hall, Englewood Cliffs, NJ 07632, 2003. • Transportation Research Board, “Highway Capacity Manual”, National Research Council, Washington, 2009.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • Public Transportation Guidelines • Guidelines for Providing Access to Public Transportation Stations
4. List Electronic Materials(eg. Web Sites, Social Media, Blackboard, etc.) • http://www.sciencedirect.com. • http://www.trb.org/Main/Home.aspx
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. • Latest Public Transportation System Design Software

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

Classroom for about 40 students, with white board, computer, projector and internet.

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computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) A white board & Computer with internet and data show. Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.

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1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching • The Faculty must has an Associate Dean for Teaching responsible for all learning and teaching matters. For each Faculty there is a Directorate (responsible for the allocation of resources) and a Board (responsible for monitoring quality issues within each department). Support is provided by Professional Development. Student feedback on modules and programmes is sought at regular intervals, individual programmes are reviewed annually, and Departments review their full portfolio of programmes as part of a Periodic Programme Review (every five years). • Minor changes to module specifications are approved by the Associate Dean (Teaching) on behalf of the Faculty Board, and ratified by the University Curriculum Sub-Committee in accordance with the University's quality procedures. Major changes are formally considered by the University Curriculum Sub-Committee. • All staff participate in the University's staff appraisal scheme, which helps to identify any needs for staff skills development. Both probationary staff and those seeking promotion to Senior Lecturer are subject to a formal teaching evaluation scheme.
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- Other development opportunities are provided in institutional strategic priority areas and in response to discussions with departments in the context of their needs.
  - Lectures
  - Tutorial
  - Survey Lab
  - Class Activity

3 Processes for Improvement of Teaching

- Increasing the number of computers.
- E- learning
- Field applications must be completed
- Additional training for the staff assist.
- Scanning electron microscope.
- Multi-media facility (video projector, TV, etc.,).

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- Check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Shortage of computer systems and modern lab facilities must be solved
- Unavailability of technical staff must be solved
- Time is not enough must be solved
- Too many topics must be solved
- In-adequate experimental setup must be solved

Faculty or Teaching Staff: Sajjad Memon

Signature: _____ **Date Report Completed:** _____

Received by: _____ **Dean/Department Head**

Signature: _____ **Date:** _____

COURSE SPECIFICATIONS
Form

Course Title: Airport Planning and Design

Course Code: 803646-3

Institution	Date of Report
Umm Al-Qura University	November 18, 2018
College/Department: College of Engineering & Islamic Architecture, Civil Engineering Department	

A. Course Identification and General Information

1. Course title and code

2. Credit hours
   3 hours

3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
   Masters in Transportation Engineering

4. Name of faculty member responsible for the course
   Dr. Mohammed Alawi

5. Level/year at which this course is offered
   Graduate Level

6. Pre-requisites for this course (if any)
   -

7. Co-requisites for this course (if any)
   -

8. Location if not on main campus
   Not Applicable

9. Mode of Instruction (mark all that apply)

p. Traditional classroom	✓	What percer	100
q. Blended (traditional and onli		What percer	
r. E-learning		What percer	
s. Correspondence		What	ntage?
t. Other		What percer	

Comments:

B Objectives

1. What is the main purpose for this course? The main purpose of this course is: • Develop understanding about fundamental aspects of air transportation, airport planning and site selection. • Ability to undertake geometric design of major airport elements. • Ability to analyze and design pavement structure for runways, taxiways and aprons. • Understanding the impact of air transportation on environment and mitigation measures.
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) • Increasing the number of computers. • E- learning • Increased use of IT or web based reference material, • Changes in content as a result of new research in the field

C. Course Description: Fundamental aspects of airport planning, design and management, impact of climate change and environment, and use of latest software use.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Introduction to the Course	0.67	2
Fundamental aspects of airport planning and data requirement	0.67	2
Data collection and demand forecasting	0.67	2
Aircraft characteristics, classifications and selection of design aircraft	1	3
Airport geometry and layout	0.67	2
Air Traffic Control and Navigation-aids	1	3
Sustainability considerations for airport Land Use Planning	1	3
Passenger terminal building layout and services	1	3
Air cargo terminal building layout and services	1.33	4
Conceptual aspects of integration with multimodal ransportation	0.67	2
Planning for small airports	1	3
Environment impact of airports and mitigation measures	0.67	2
Airport drainage layout and design	1	3
Airport safety and security measures	0.67	2
Airport management and airspace considerations	1.33	4

Socio-economic aspects of air transportation	1.33	4
Modern trends in air transportation	1.33	4

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	48	-		-	-	48
Credit	3	-	-	-	-	3

3. Additional private study/learning hours expected for students per week: 5

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Ability to understand about fundamental aspects of air transportation, airport planning and site selection.	• Through lectures, module notes, tutorials, coursework and examinations. • Through group project work requiring detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular topic for their Individual Project requiring a multi-disciplinary approach	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations • Project report(s), oral examination and writing of a journal-style paper
1.2	Ability to undertake geometric design of major airport elements.		
1.3	Ability to analyze and design pavement structure for runways, taxiways and aprons.		
1.4	Ability to understanding the impact of air transportation on environment and mitigation measures		
2.0	**Cognitive Skills**		
2.1	To increase the ability to develop airport master plan and undertake site selection	• Through lectures, module notes, tutorials, coursework and examinations. • Through group project work that will require detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations
2.2	Ability to develop geometric design of key airport elements, like runways, taxiways, apron, etc		
2.3	Ability to undertake structural design of key airport element		

2.4	Ability to optimize management aspects of airspace management	topic in the compulsory Individual Project module requiring a multi-disciplinary approach	• Project report(s), oral examination and writing of a journal-style paper
2.5	Impact of airport operations on environment and mitigation measures		
2.6	Ability to understand modern trends and its implications on airport infrastructure.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Increasing the ability to understand airport layout and geometics	• Through lectures, tutorials, coursework and group project work. • Through supervised laboratory exercises following standard procedures • Through supervised outdoor practical work • Through supervised computer based laboratory exercises.	• Assessed out of class and in-class coursework. (Laboratory and fieldwork reports, modelling calculations) • Project reports and peer review of individual contributions to group work • Observation by tutors during laboratory and fieldwork activities
3.2	Overcoming challenges in structural design of growing air transport		
3.3	Preparing our graduates for immediate employment in any primary branch of civil engineering.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Developing the sensitivity of the students to highway and airport design and pavement maintenance	• Through lectures, module notes, tutorials, coursework, examinations and group project work. • Through detailed research and analysis of a particular topic in the compulsory Individual Project module requiring a multi-disciplinary approach • Through supervised laboratory exercises following standard procedures • Through supervised field work.	• Assessed out of class and in-class coursework. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations and literature review. • Written examinations • Project reports, oral and writing of a journal-style paper • Peer review of individual contributions to group work
4.2	Developing the ability of students to do highway and airport design and pavement maintenance using both basic principles and modern engineering tools.		
4.3	Preparing our graduates to work effectively in modes ranging from independent study to multi-disciplinary teams.		
5.0	**Psychomotor**		
5.1	-	-	-
5.2	-	-	-

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework	Bi-weekly	10%
2	Quizzes	Bi-weekly	15%
3	Term Project	Weeks 4-12	10%
4	Midterm Exam	Week 8	25%
5	Final Exam	Week 17	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)
   - All faculty has allocated tutorial or consultation hours during which the concerned teaching staff is available to provide academic advising to students.
   - Generally, five hours are allocated per week and displayed outside office of the concerned teaching staff to facilitate advising to the students.

E. Learning Resources

1. List Required Textbooks
   - Seth B. Young and Alexander T. Wells, *Airport Planning & Management*, published by McGraw Hill, New York, USA, 2011.
   - Subhash C. Saxena, “Airport Engineering, Planning and Design”, CBS Publishers, New Delhi, 2012

2. List Essential References Materials (Journals, Reports, etc.)
   - Y. H. Huang, “Pavement Analysis and Design”, Pearsons, 2012.
   - A.T Papagiannakis and E.A. Masad, “Pavement Design and Materials”, John Wiley & Sons, Inc. 2008, USA.
   - Margaret Grieco and John Urry, Mobility: new perspective on transport and society, MPG Books Group, UK, 2011.

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
   - AASHTO - Guide for Design of Pavement Structures, 4th Edition with 1998 Supplement
   - AASHTO - Mechanistic-Empirical Pavement Design Guide: A Manual of Practice, 2nd Edition
   - AASHTO - Pavement Design, Construction, and Management: A Digital Handbook, 1st Edition

4. List Electronic Materials(eg. Web Sites, Social Media, Blackboard, etc.)
   - http://www.sciencedirect.com.
   - http://www.trb.org/Main/Home.aspx

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Classroom for about 40 students, with white board, computer, projector and internet. **Library:** The University Library provides advanced support for student learning in a purpose-built building and electronically via the web. It is open for upwards of 80 hours per week during semester and holds a stock of more than half a million volumes and an extensive serials collection. Numerous PC workstations (100+), networked printing facilities and self-service photocopiers are also available. The Library catalogue is available on-line, as are electronic versions of reading lists. Over 180 subject-specific electronic databases can be accessed by users both on campus and elsewhere. The Library organizes induction sessions for first year students and librarians can provide flexible training for students and researchers throughout their time. User support is also available from the Library information desks, via printed and online guides and through a series of 'Lunchtime in the Library' and other training sessions. There are a variety of study environments in the Library, including individual and group study desks and group study rooms. **Engineering Education Centre:** The Engineering Education Centre supports the implementation of innovative Teaching and Learning Methods into the curriculum, within the Faculty of Engineering, via the use of appropriate technologies. The Centre provides a focus for computer based learning and teaching activities in the Engineering Faculty, unlimited advice on Computer aided learning/assessment and distance learning materials, a limited amount of free software development time, and help to secure funding and manage projects relevant to learning and teaching. **Counselling Service and English Language Study Unit:** The Counselling Service and English Language Study Unit are able to support individual students in resolving problems and in improving communication skills for international students.
2. Computing resources (AV, data show, Smart Board, software, etc.) Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist

computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) A white board & Computer with internet and data show. Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching • The Faculty must has an Associate Dean for Teaching responsible for all learning and teaching matters. For each Faculty there is a Directorate (responsible for the allocation of resources) and a Board (responsible for monitoring quality issues within each department). Support is provided by Professional Development. Student feedback on modules and programs is sought at regular intervals, individual programs are reviewed annually, and Departments review their full portfolio of program as part of a Periodic Program Review (every five years). • Minor changes to module specifications are approved by the Associate Dean (Teaching) on behalf of the Faculty Board, and ratified by the University Curriculum Sub-Committee in accordance with the University's quality procedures. Major changes are formally considered by the University Curriculum Sub-Committee. • All staff participate in the University's staff appraisal scheme, which helps to identify any needs for staff skills development. Both probationary staff and those seeking promotion to Senior Lecturer are subject to a formal teaching evaluation scheme.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • New lecturers attend a personalisedprogramme of courses and, in the final year of probation, they assesses their teaching through direct observation and a portfolio. • Professional Development works directly with staff who wish to develop more effective teaching and learning methods - including the area of learning technologies - and provides resources to support the learning skills development of students. • Other development opportunities are provided in institutional strategic priority areas and in response to discussions with departments in the context of their needs. • Lectures • Tutorial • Survey Lab • Class Activity
3 Processes for Improvement of Teaching • Increasing the number of computers.

- E- learning
- Field applications must be completed
- Additional training for the staff assist.
- Scanning electron microscope.
- Multi-media facility (video projector, TV, etc.,).

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

Check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Shortage of computer systems and modern lab facilities must be solved
- Unavailability of technical staff must be solved
- Time is not enough must be solved
- Too many topics must be solved
- In-adequate experimental setup must be solved

Faculty or Teaching Staff: Dr. Hasan Tayyeb

Signature: _____ **Date Report Completed:** _____

Received by: _____ **Dean/Department Head**

Signature: _____ **Date:** _____

COURSE SPECIFICATIONS
Form

Course Title: Advance Geometric Design of Highways

Course Code: 803647

Institution	Date of Report
Umm Al-Qura University	November 18, 2018
College/Department: College of Engineering & Islamic Architecture, Civil Engineering Department	

A. Course Identification and General Information

1. Course title and code Advance Geometric Design of Highways, 803647		
2. Credit hours 3 hours		
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Master's in Transportation Engineering		
4. Name of faculty member responsible for the course Prof. Dr. Mohammed A. Saif		
5. Level/year at which this course is offered Graduate Level		
5. Pre-requisites for this course: Highway Design and Materials (803642-3)		
7. Co-requisites for this course (if any) -		
8. Location if not on main campus Not Applicable		
9. Mode of Instruction (mark all that apply)		
u. Traditional classroom	✓	What percentage? 100
v. Blended (traditional and online)		What percentage?
w. E-learning		What percentage?

x. Correspondence		What percentage?
y. Other		What percent

Comments:

B **Objectives**

1. What is the main purpose for this course?

The main purpose of this course is:

- Learn about design controls and criteria for highway design.
- Acquire knowledge about fundamentals of highway cross sections elements, roadside design and highway safety.
- Acquire expertise about design of at grade intersections, grade separation and interchanges.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

- Increasing the number of computers.
- E- learning
- Increased use of IT or web based reference material,
- Changes in content as a result of new research in the field

C. Course Description : Highway alignment selection, geometric design of highway elements, including , roadside, drainage and use of modern softwares.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Introduction to the Course	0.67	2
Highway Geometrics, Criteria and Standards	1.33	4

Design of Highway Cross Section Elements	1.33	4
Sight Distances - Types and Standards	0.67	2
Highway Horizontal Alignment	1.33	4
Highway Vertical Alignment	1.33	4
Roadside Design	0.67	2
Planning and Design for Pedestrians	1	3
Design of At-Grade Intersections and Grade Separations	1.33	4
Highway Safety Audit	0.67	2
Design of Parking and Terminal Facilities	1.33	4
Tutorial, Exams, etc	1.33	4

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	48	-	-	-	-	48
Credit	3	-	-	-	-	3

3. Additional private study/learning hours expected for students per week. 5

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		

1.1	Learn about design controls and criteria for highway design.	• Through lectures, module notes, tutorials, coursework and examinations. • Through group project work requiring detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular topic for their Individual Project requiring a multi-disciplinary approach	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations • Project report(s), oral examination and writing of a journal-style paper
1.2	Acquire knowledge about fundamentals of highway cross sections elements, roadside design and highway safety.		
1.3	Acquire expertise about design of at grade intersections, grade separation and interchanges.		
2.0	**Cognitive Skills**		
2.1	To increase the ability to design controls and develop criteria for highway design.	• Through lectures, module notes, tutorials, coursework and examinations. • Through group project work that will require detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular topic in the compulsory Individual Project module requiring a multi-disciplinary approach	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations • Project report(s), oral examination and writing of a journal-style paper. • Peer review of individual contributions to group work
2.2	To increase the ability to design highway cross sections elements, roadside design and undertake highway safety using both basic principles and modern engineering tools.		
2.3	To increase the expertise about design of at grade intersections, grade separation and interchanges.		
2.4	To formulate relevant analysis and to derive the solutions for them.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Increasing the ability to understand geometric design of highways	• Through lectures, tutorials, coursework and group project work. • Through supervised laboratory exercises following standard procedures	• Assessed out of class and in-class coursework. (Laboratory and fieldwork reports, modelling calculations)
3.2	Overcoming the problems of geometric design of highways		

3.3	Preparing our graduates for immediate employment in any primary branch of civil engineering.	• Through supervised outdoor practical work • Through supervised computer based laboratory exercises	• Project reports and peer review of individual contributions to group work • Observation by tutors during laboratory and fieldwork activities
4.0	**Communication, Information Technology, Numerical**		
4.1	Developing the sensitivity of the students to Geometric design of highways	• Through lectures, module notes, tutorials, coursework, examinations and group project work. • Through detailed research and analysis of a particular topic in the compulsory Individual Project module requiring a multi-disciplinary approach • Through supervised laboratory exercises following standard procedures • Through supervised field work	• Assessed out of class and in-class coursework. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations and literature review. • Written examinations • Project reports, oral and writing of a journal-style paper • Peer review of individual contributions to group work
4.2	Developing the ability of students to do geometric design of highways using both basic principles and modern engineering tools.		
4.3	Preparing our graduates to work effectively in modes ranging from independent study to multi-disciplinary teams.		
5.0	**Psychomotor**		

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework	Bi-weekly	10%
2	Quizzes	Bi-weekly	15%
3	Term Project	Weeks 6-8	10%
4	Midterm Exam	Week 8	25%
5	Final Exam	Week 17	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week) • All faculty has allocated tutorial or consultation hours during which the concerned teaching staff is available to provide academic advising to students. • Generally, five hours are allocated per week and displayed outside office of the concerned teaching staff to facilitate advising to the students.

E. Learning Resources

1. List Required Textbooks • N.J. Garber and L.A. Hoel, "Traffic and Highway Engineering" 3rd Edition, PWS Publishing, New York, 2002
2. List Essential References Materials (Journals, Reports, etc.) • F.L. Mannering, S.S. Washburn and W.P. Kilareski, "Principles of Highway Engineering and Traffic Analysis" 4th Edition, John Wiley & Sons, Washington D.C, 2009. • C. Jotin, Khisty, B. Kent Lall, “Transportation Engineering”, 3rd Edition, Prentice Hall, Englewood Cliffs, New Jersey 07458, 2003. • Paul H. Wright and Karen K. Dixon, "Highway Engineering" 7th Edition, John Wiley & Sons, Inc., 2004.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • AASHTO – A Policy on Geometric Design of Highways and Streets, 2014, 6th Edition. • Highway Design Manual, Ministry of Transport, KSA. • AASHTO - A Guide for Achieving Flexibility in Highway Design, 1st Edition • AASHTO - Guide for Geometric Design of Transit Facilities on Highways and Streets, 1st Edition • AASHTO - Highway Safety Design and Operations Guide, 3rd Edition
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • http://www.sciencedirect.com. • http://www.trb.org/Main/Home.aspx
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. • Latest Highway Geometric Design Software

F. Facilities

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Classroom for about 40 students, with white board, computer, projector and internet. **Library:** The University Library provides advanced support for student learning in a purpose-built building and electronically via the web. It is open for upwards of 80 hours per week during semester and holds a stock of more than half a million volumes and an extensive serials collection. Numerous PC workstations (100+), networked printing facilities and self-service photocopiers are also available. The Library catalogue is available on-line, as are electronic versions of reading lists. Over 180 subject-specific electronic databases can be accessed by users both on campus and elsewhere. The Library organizes induction sessions for first year students and librarians can provide flexible training for students and researchers throughout their time. User support is also available from the Library information desks, via printed and online guides and through a series of 'Lunchtime in the Library' and other training sessions. There are a variety of study environments in the Library, including individual and group study desks and group study rooms. **Engineering Education Centre:** The Engineering Education Centre supports the implementation of innovative Teaching and Learning Methods into the curriculum, within the Faculty of Engineering, via the use of appropriate technologies. The Centre provides a focus for computer based learning and teaching activities in the Engineering Faculty, unlimited advice on Computer aided learning/assessment and distance learning materials, a limited amount of free software development time, and help to secure funding and manage projects relevant to learning and teaching. **Counselling Service and English Language Study Unit:** The Counselling Service and English Language Study Unit are able to support individual students in resolving problems and in improving communication skills for international students.
2. Computing resources (AV, data show, Smart Board, software, etc.) Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in

connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) A white board & Computer with internet and data show. Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Student questionnaire at the end of the semester. • Student test result analysis. • Regular feedback from students.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • Regular review of the course contents by the related department committee. • Input from visiting professors.
3 Processes for Improvement of Teaching • Regular updating of learning resources. • Usage of new technologies in presenting the course materials. • Self-learning. • Promote reading of outside materials. • Encouraging students to conduct scientific presentations and group discussions. • Additional training for the staff assist.
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) • Check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution

• A review of a sample of student answers by a related department committee. • In-department group review and marking. • External reviewer for a sample of student answering sheets.
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • Regular updating of learning resources. • Usage of new technologies in presenting the course materials. • Regular review of the course content by the related department committee. • Input from external and internal reviewers.

Faculty or Teaching Staff: Dr. Imtiaz Ahamd

Signature: _____ **Date Report Completed:** _____

Received by: _____ **Dean/Department Head**

Signature: _____ **Date:** _____

COURSE SPECIFICATIONS
Form

Course Title: Railway Engineering

Course Code: 803646-3

Date: 2018-١١-١١	Institution: Umm Al Qura University
College: College Of Engineering And Islamic Architecture Department: Civil Engineering	

A. Course Identification and General Information

1. Course title and code: Railway Engineering 803648-3		
2. Credit hours: 3 hrs.		
3. Program(s) in which the course is offered. Civil & Transportation Engineering (If general elective available in many programs indicate this rather than list programs)		
4. Name of faculty member responsible for the course Prof. Dr. Imtiaz Ahmed Said Ahmed		
5. Level/year at which this course is offered: Masters/3rd year of Bachelors		
6. Pre-requisites for this course (if any): Engineering mechanics and solid mechanics		
7. Co-requisites for this course (if any):		
8. Location if not on main campus:		
9. Mode of Instruction (mark all that apply):		
a. Traditional classroom	√	percenta ١٠٠
b. Blended (traditional and online)		percentage
c. E-learning		percen
d. Correspondence		percent
f. Other		percer
Comments:		

B Objectives

1. The course will cover engineering principles, standards of rails, gauges, sleepers, formation and embankments. It will cover geometics, structural design and sustainability aspects of railroad tracks. It also includes impacts of railroads on the society and environment. The course will focus on alignment, track geometry, superstructure and substructure components, switches, Railway planning and capacity, electrotechnical installations (power supply and signalling control system) together with operation and maintenance of railway.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description: In this course, student will acquire, fundamental principles for railway engineering, basic track geometry parameters, railway superstructure and substructure components, operation and maintenance aspects of railway system, railway electrotechnical installations, environmental and societal impact of railway infrastructure.

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
History, significance and classifications of permanent way	3	8
Alignment, Geometrics and Structural Design of rail road components	2	8
Track stresses, Resistance to Traction, Points And Crossings	2	8
Railway Stations and Yards	2	8
Signaling and Interlocking Systems	2	8
Management, Maintenance and Upgradation of Railway Track	2	8

2. Course components (total contact and credit hours per semester):						
	Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total

Contact Hours	Planned	48	0	-			48
	Actual	48	0	-			48
Credit	Planned	3					
	Actual	3	70%	30%			3

3. Individual study/learning hours expected for students per week.	5

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column.

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Explain Components of Railway Track, different Railway Gauges	In class	reports, and presentations
1.2	Design track Gradients as per given requirements	In class	Problem
2.0	Cognitive Skills		
2.1	Discuss various Types of Track Turnouts	In class & filed	reports, and projects,
2.2	Design on available documents & drawings	In class	presentations and quizzes
3.0	Interpersonal Skills & Responsibility		
3.1	Problem solving skills	In class	Reports
3.2	Analyze a case study site	In class	presentations and quizzes
4.0	Communication, Information Technology, Numerical		
4.1	Describe purposes and facilities at Railway Stations	Fields	projects,
4.2	Explain Interlocking and modern signal system	In class & iled	presentations and quizzes
5.0	Psychomotor(if any)		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Report	3, 5	10 %
2	Presentation	4, 6	15 %

3	Projects	8-15	15 %
4	Midterm	7	20 %
5	Final Exam	16	40 %

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week) All faculty has allocated tutorial or consultation hours during which the concerned teaching staff is available to provide academic advising to students. Generally, five hours are allocated per week and displayed outside office of the concerned teaching staff to facilitate advising to the students.

E. Learning Resources

1. List Required Textbooks N.J. Garber and L.A. Hoel, "Traffic and Highway Engineering" 3rd Edition, PWS Publishing, New York, 2002
2. List Essential References Materials (Journals, Reports, etc.) F.L. Mannering, S.S. Washburn and W.P. Kilareski, "Principles of Highway Engineering and Traffic Analysis" 4th Edition, John Wiley & Sons, Washington D.C, 2009. C. Jotin, Khisty, B. Kent Lall, “Transportation Engineering”, 3rd Edition, Prentice Hall, Englewood Cliffs, New Jersey 07458, 2003. Paul H. Wright and Karen K. Dixon, "Highway Engineering" 7th Edition, John Wiley & Sons, Inc., 2004.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) AASHTO – A Policy on Geometric Design of Highways and Streets, 2014, 6th Edition. Highway Design Manual, Ministry of Transport, KSA. AASHTO - A Guide for Achieving Flexibility in Highway Design, 1st Edition AASHTO - Guide for Geometric Design of Transit Facilities on Highways and Streets, 1st Edition AASHTO - Highway Safety Design and Operations Guide, 3rd Edition
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) http://www.sciencedirect.com. http://www.trb.org/Main/Home.aspx
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. Latest Highway Geometric Design Software

F. Facilities

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Classroom for about 40 students, with white board, computer, projector and internet. Library: The University Library provides advanced support for student learning in a purpose-built building and electronically via the web. It is open for upwards of 80 hours per week during semester and holds a stock of more than half a million volumes and an extensive serials collection. Numerous PC workstations (100+), networked printing facilities and self-service photocopiers are also available. The Library catalogue is available on-line, as are electronic versions of reading lists. Over 180 subject-specific electronic databases can be accessed by users both on campus and elsewhere. The Library organizes induction sessions for first year students and librarians can provide flexible training for students and researchers throughout their time. User support is also available from the Library information desks, via printed and online guides and through a series of 'Lunchtime in the Library' and other training sessions. There are a variety of study environments in the Library, including individual and group study desks and group study rooms. Engineering Education Centre: The Engineering Education Centre supports the implementation of innovative Teaching and Learning Methods into the curriculum, within the Faculty of Engineering, via the use of appropriate technologies. The Centre provides a focus for computer based learning and teaching activities in the Engineering Faculty, unlimited advice on Computer aided learning/assessment and distance learning materials, a limited amount of free software development time, and help to secure funding and manage projects relevant to learning and teaching. Counseling Service and English Language Study Unit: The Counseling Service and English Language Study Unit are able to support individual students in resolving problems and in improving communication skills for international students.
2. Computing resources (AV, data show, Smart Board, software, etc.) Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) A white board & Computer with internet and data show. Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Student questionnaire at the end of the semester. Student test result analysis. Regular feedback from students.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor Regular review of the course contents by the related department committee. Input from visiting professors.
3 Processes for Improvement of Teaching Regular updating of learning resources. Usage of new technologies in presenting the course materials. Self-learning. Promote reading of outside materials. Encouraging students to conduct scientific presentations and group discussions. Additional training for the staff assist.
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) Check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution A review of a sample of student answers by a related department committee. In-department group review and marking. External reviewer for a sample of student answering sheets.
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. Regular updating of learning resources. Usage of new technologies in presenting the course materials. Regular review of the course content by the related department committee. Input from external and internal reviewers.

Faculty or Teaching Staff: Dr. Imtiaz Ahmad

Signature: _____ Date Report Completed: _____

Received by: _____ Dean/Department Head

Signature: _____ Date: _____

COURSE SPECIFICATIONS
Form

Course Title: Special Topics in Transportation Engineering

Course Code: 803655-3

Date: 2018-١١-١١	**Institution:** Umm Al Qura University
College: College Of Engineering And Islamic Architecture **Department:** Civil Engineering	

A. Course Identification and General Information

1. Course title and code: Special Topics in Transportation Engineering 803655-3
2. Credit hours: 3 hrs.
3. Program(s) in which the course is offered. Civil & Transportation Engineering: -
4. Name of faculty member responsible for the course: Sajjad Memon
5. Level/year at which this course is offered: Masters/4th year of Bachelors
6. Pre-requisites for this course (if any): Transportation Planning
7. Co-requisites for this course (if any):
8. Location if not on main campus:
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	١٠٠
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

6. Understand the basic concepts and limitations of the financial evaluation proce ss used to assess transportation improvement projects

2.Have the skills required to select the preferred transportation project from a number of candidate projects using financial project evaluation techniques

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The goal of this course is to introduce students to the major theories, principles an d methods used in the field of transportation economics and project evaluation. M ore specifically, the course presents the fundamental concepts and tools used in t he economic evaluation of surface infrastructure and transportation system improv ement projects. The emphasis is on understanding benefit-cost analysis and life-cycle cost analysis, and how these analyses are used to support decision makers' project investment decisions.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Basic concept of project evaluation for transportation infrastructure Improvements	2	6
Assessing user benefits (e.g., travel time savings) and giving them a monetary value	2	7
Assessing non-user benefits (e.g., environmental impacts) and giving them a monetary value	2	7
Estimating costs of a project (monetary costs)	2	7
Financial assessment of transportation project	2	7
Benefit-cost analysis	2	7
Life- cycle cost analysis	2	7

2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	48	0				48
	Actual	48	0				48
Credit	Planned	3					3
	Actual	3	100%				3

3. Individual study/learning hours expected for students per week.	5

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column.

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Principles and methods used in the field of Transportation	In class	reports, and presentations
1.2	Use of fundamental concepts and tools	In class	reports
2.0	**Cognitive Skills**		
2.1	Engineering problem solving	In class & filed	reports, and projects,
2.2	Design components, systems or processes in presence of constraints	In class	presentations and quizzes
3.0	**Interpersonal Skills & Responsibility**		
3.1	support decision makers	In class	Reports
3.2			presentations and quizzes
4.0	**Communication, Information Technology, Numerical**		
4.1	Cost analysis and	In Class	Reports
4.2	life- cycle cost analysis	In Class	Reports
5.0	**Psychomotor(if any)**		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Assignment	3, 5, 7, 12	10 %
2	Case Study and Presentation	10	15 %
3	Midterm	7	20 %
4	Final Exam	15	50 %
5	Attendance	15	5%
6			

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week) 20 hrs.

E Learning Resources

1. List Required Textbooks Engineering Economics and Finance for Transportation Infrastructure by Elena S. Prassa s and Roger P. Roess, Springer, ISSN 2194-8119
2. List Essential References Materials (Journals, Reports, etc.)
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) 20
2. Technology resources (AV, data show, Smart Board, software, etc.) Multimedia projector, Laptop, whiteboard and printer
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
3. Procedures for Teaching Development
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: Dr. Mohammad Saif

Signature: _____ Date Completed: _____

Program Coordinator:
_____

Signature: _____ Date Received:
_____

COURSE SPECIFICATIONS
Form

Course Title: Design of Asphalt Mixes

Course Code: 803656-3

Institution	Date of Report
Umm Al-Qura University	November 30, 2015
College/Department: College of Engineering & Islamic Architecture, Civil Engineering Department	

A. Course Identification and General Information

1. Course title and code Design of Asphalt Mixes, 803656
2. Credit hours 3 hours
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Master's in Transportation Engineering
4. Name of faculty member responsible for the course Prof. Dr. Mohammed Hasan Alawi
5. Level/year at which this course is offered Graduate Level
6. Pre-requisites for this course (if any) 803642-3 Highway Engineering and Materials
7. Co-requisites for this course (if any) -
8. Location if not on main campus Not Applicable
9. Mode of Instruction (mark all that apply) z. Traditional classroom ✓ What percentage? 100

aa. Blended (traditional and online)	☐	What percentage? ☐
bb. E-learning	☐	What percentage? ☐
cc. Correspondence	☐	What percentage? ☐
dd. Other	☐	What percentage? ☐

Comments:

B Objectives

1. What is the main purpose for this course?

The main purpose of this course is:

- Ability to characterize soils and learn about its engineering behavior in highway construction.
- Ability to design of highway pavements by various methods.
- Ability to apply soil engineering knowledge in construction of pavements, embankments and retaining structures.
- Understanding of impact of environment on soils and learn about soil improvement techniques.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

- Increasing the number of computers.
- E- learning
- Increased use of IT or web based reference material,
- Changes in content as a result of new research in the field

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
Introduction to the Course	0.67	2
Review of various bituminous products	0.67	2
Characterization of Asphalt, Cutbacks, Emulsions.	0.67	2
Characterization of aggregates for pavements granular and asphalt bases	1	3
Impact of environment on engineering properties of aggregates	0.67	2
Marshall Method of Asphalt Mix Design	2	6
Pavement Distresses and Impact of Climate Change	1	3
Evaluation of stress-strain-strength properties of aggregates	1.33	4
Soil resilient modulus Testing and Analysis	2	6
California Bearing Ratio tests and Correlations with resilient modulus and other design parameters	0.67	2
Paving materials testing and specifications	1	3
Design options for highway pavements	0.67	2
Design of Flexible pavement by AASHTO and Mechanistic - Empirical Methods	1.33	4
Superpave Mix Design	1.33	4
Tutorial, Exams, etc.	1.33	4

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	32	-	16	-	-	48
Credit	3	-	-	-	-	3

3. Additional private study/learning hours expected for students per week	5

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Ability to characterize soils and learn about its engineering behavior in highway construction.	• Through lectures, module notes, tutorials, coursework and examinations. • Through group project work requiring detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular topic for their Individual Project requiring a multi-disciplinary approach	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations • Project report(s), oral examination and writing of a journal-style paper
1.2	Ability to design of highway pavements by various methods.		
1.3	Ability to apply soil engineering knowledge in construction of pavements, embankments and retaining structures.		
1.4	Understanding of impact of environment on soils and learn		

	about soil improvement techniques.		
2.0	**Cognitive Skills**		
2.1	To increase the ability to characterize soils and learn about its engineering behavior in highway construction.	• Through lectures, module notes, tutorials, coursework and examinations. • Through group project work that will require detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular topic in the compulsory Individual Project module requiring a multi-disciplinary approach	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations • Project report(s), oral examination and writing of a journal-style paper
2.2	To increase the ability to design highway pavements by various methods.		
2.3	To increase the ability to apply soil engineering knowledge in construction of pavements, embankments and retaining structures.		
2.4	To increase the ability of students to consider the impact of environment on soils and utilize appropriate soil improvement techniques.		
2.5	To prepare the students to design highway and airport pavement along with maintenance using both basic principles and modern engineering tools.		
2.6	To formulate relevant analysis and to derive the solutions for them.		
3.0	**Interpersonal Skills & Responsibility**		

3.1	Increasing the ability to understand highway and airport design and pavement.	• Through lectures, tutorials, coursework and group project work. • Through supervised laboratory exercises following standard procedures • Through supervised outdoor practical work • Through supervised computer based laboratory exercises.	• Assessed out of class and in-class coursework. (Laboratory and fieldwork reports, modelling calculations) • Project reports and peer review of individual contributions to group work • Observation by tutors during laboratory and fieldwork activities
3.2	Overcoming the problems of highway and airport design and pavement.		
3.3	Preparing our graduates for immediate employment in any primary branch of civil engineering.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Developing the sensitivity of the students to highway and airport design and pavement maintenance	• Through lectures, module notes, tutorials, coursework, examinations and group project work. • Through detailed research and analysis of a particular topic in the compulsory Individual Project module requiring a multi-disciplinary approach • Through supervised laboratory exercises following standard procedures • Through supervised field work.	• Assessed out of class and in-class coursework. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations and literature review. • Written examinations • Project reports, oral and writing of a journal-style paper • Peer review of individual contributions to group work
4.2	Developing the ability of students to do highway and airport design and pavement maintenance using both basic principles and modern engineering tools.		
4.3	Preparing our graduates to work effectively in modes ranging from independent study to multi-disciplinary teams.		
5.0	**Psychomotor**		

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework	Bi-weekly	10%
2	Quizzes	Bi-weekly	10%
3	Term Project	Weeks 4-12	15%
4	Midterm Exam	Week 8	25 %
5	Final Exam	Week 17	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- All faculty has allocated tutorial or consultation hours during which the concerned teaching staff is available to provide academic advising to students.
- Generally, five hours are allocated per week and displayed outside office of the concerned teaching staff to facilitate advising to the students.

E. Learning Resources

1. List Required Textbooks

- A.T. Papagiannakis and E.A. Masad, "Pavement Design and Materials" Ist Edition , John Wiley & Sons, Inc, New Jersey, 2008

2. List Essential References Materials (Journals, Reports, etc.)

- Y. H. Huang, “Pavement Analysis and Design”, Pearsons, 2012.
- The Asphalt Institute Manual Series, No. 2 (MS-2), “Mix Design Methods for Asphalt Concrete and Other Hot Mix Types”.
- Yoder, E.J. and Witczak, M.D., “Principle of Pavement Design”, 2nd Edition, John Wiley & Sons, Inc. 1975.

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • AASHTO - Guide for Design of Pavement Structures, 4th Edition with 1998 Supplement • AASHTO - Mechanistic-Empirical Pavement Design Guide: A Manual of Practice, 2nd Edition • AASHTO - Pavement Design, Construction, and Management: A Digital Handbook, 1st Edition
4. List Electronic Materials(eg. Web Sites, Social Media, Blackboard, etc.) • http://www.sciencedirect.com. • http://www.trb.org/Main/Home.aspx • http://www.pavementinteractive.org/
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. • Latest Pavement Design and Analysis Software

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Classroom for about 40 students, with white board, computer, projector and internet. **Library:** The University Library provides advanced support for student learning in a purpose-built building and electronically via the web. It is open for upwards of 80 hours per week during semester and holds a stock of more than half a million volumes and an extensive serials collection. Numerous PC workstations (100+), networked printing facilities and self-service photocopiers are also available. The Library catalogue is available on-line, as are electronic versions of reading lists. Over 180 subject-specific electronic databases can be accessed by users both on campus and elsewhere. The Library organizes induction sessions for first year students and librarians can provide flexible training for students and researchers throughout their time. User support is also

available from the Library information desks, via printed and online guides and through a series of 'Lunchtime in the Library' and other training sessions. There are a variety of study environments in the Library, including individual and group study desks and group study rooms.

Engineering Education Centre:

The Engineering Education Centre supports the implementation of innovative Teaching and Learning Methods into the curriculum, within the Faculty of Engineering, via the use of appropriate technologies. The Centre provides a focus for computer based learning and teaching activities in the Engineering Faculty, unlimited advice on Computer aided learning/assessment and distance learning materials, a limited amount of free software development time, and help to secure funding and manage projects relevant to learning and teaching.

Counselling Service and English Language Study Unit:

The Counselling Service and English Language Study Unit are able to support individual students in resolving problems and in improving communication skills for international students.

2. Computing resources (AV, data show, Smart Board, software, etc.)

Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

A white board & Computer with internet and data show.

Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network.

The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- The Faculty must has an Associate Dean for Teaching responsible for all learning and teaching matters. For each Faculty there is a Directorate (responsible for the allocation of resources) and a Board (responsible for monitoring quality issues within each department). Support is provided by Professional Development. Student feedback on modules and program is sought at regular intervals, individual programs are reviewed annually, and Departments review their full portfolio of programs as part of a Periodic Program Review (every five years).
- Minor changes to module specifications are approved by the Associate Dean (Teaching) on behalf of the Faculty Board, and ratified by the University Curriculum Sub-Committee in accordance with the University's quality procedures. Major changes are formally considered by the University Curriculum Sub-Committee.
- All staff participate in the University's staff appraisal scheme, which helps to identify any needs for staff skills development. Both probationary staff and those seeking promotion to Senior Lecturer are subject to a formal teaching evaluation scheme.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

- New lecturers attend a personalized program of courses and, in the final year of probation, they assesses their teaching through direct observation and a portfolio.
- Professional Development works directly with staff who wish to develop more effective teaching and learning methods - including the area of learning technologies - and provides resources to support the learning skills development of students.
- Other development opportunities are provided in institutional strategic priority areas and in response to discussions with departments in the context of their needs.
- Lectures
- Tutorial
- Survey Lab
- Class Activity

3 Processes for Improvement of Teaching

- Increasing the number of computers.
- E- learning
- Field applications must be completed
- Additional training for the staff assist.
- Scanning electron microscope.
- Multi-media facility (video projector, TV, etc.,).

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) • Check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • Shortage of computer systems and modern lab facilities must be solved • Unavailability of technical staff must be solved • Time is not enough must be solved • Too many topics must be solved • In-adequate experimental setup must be solved

Faculty or Teaching Staff: Dr. Mohammad Alawi

Signature: _____ **Date Report Completed:** _____

Received by: _____ **Dean/Department Head**

Signature: _____ **Date:** _____

ATTACHMENT

COURSE SPECIFICATIONS
Form

Course Title: Pavement Management Systems

Course Code: 803657-3

Institution	Date of Report
Umm Al-Qura University	November 18, 2018
College/Department: College of Engineering & Islamic Architecture, Civil Engineering Department	

A. Course Identification and General Information

1. Course title and code Pavement Management Systems, 803657-3
2. Credit hours 3 hours
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Masters in Transportation Engineering
4. Name of faculty member responsible for the course Prof. Dr. Imtiaz Ahmed Said Ahmed
5. Level/year at which this course is offered Graduate Level
6. Pre-requisites for this course (if any) Design of Asphalt Mixes (803656-3)
7. Co-requisites for this course (if any) -
8. Location if not on main campus Not Applicable
9. Mode of Instruction (mark all that apply) ee. Traditional classroom ✓ What percentage? 100

ff. Blended (traditional and online) ☐ What percentage? ☐

gg. E-learning ☐ What percentage? ☐

hh. Correspondence ☐ What percentage? ☐

ii. Other ☐ What percer ☐

Comments:

B Objectives

1. What is the main purpose for this course?

The main purpose of this course is:

- Learn about the characteristics of Traffic Streams
- Undertake capacity analysis under varying traffic operating conditions.
- Acquire basic knowledge about traffic control measures and traffic management tools.

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

- Increasing the number of computers.
- E- learning
- Increased use of IT or web based reference material,
- Changes in content as a result of new research in the field

C. Course Description:

Covers the development and use of Pavement Management System for Asset Management, improving data quality, optimizing quality management system and Modernizing Pavement Management.

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
Introduction to the Course	0.67	2
Traffic volume studies and traffic analysis	1.33	4
Speed Travel time, density and delay studies	1.33	4
Calibration, Modeling and Simulation Studies.	1	3
Accident studies and safety audit	1	3
Using PMS to develop transportation asset management plan	1	3
Decision Making, putting data to work	1	3
Calibrating relationships for freeways	1	3
Analysis of freeways and multilane highways	1	3
Traffic Demand Management Strategies	1	3
Developing a simple Pavement Management System	1	3
Integrating Pavement Preservation as PM System.	1	3
Techniques for addressing freeway system congestion	1	3
Use of software and modern tools for Traffic Analysis & Management	1.33	4
Tutorial, Exams, etc.	1.33	4

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	48	-	-	-	-	48
Credit	3	-	-	-	-	3

3. Additional private study/learning hours expected for students per week: 5

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Learn about the characteristics of Traffic Streams	• Through lectures, module notes, tutorials, coursework and examinations. • Through group project work requiring detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular topic for their Individual Project requiring a multi-disciplinary approach	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations • Project report(s), oral examination and writing of a journal-style paper
1.2	Undertake capacity analysis under varying traffic operating conditions.		
1.3	Acquire basic knowledge about traffic control measures and traffic management tools.		
2.0	**Cognitive Skills**		

2.1	To increase the ability to calculate traffic stream characteristics and undertake capacity analysis under varying traffic operating conditions using both basic principles and modern engineering tools.	• Through lectures, module notes, tutorials, coursework and examinations. • Through group project work that will require detailed consideration of a multi-disciplinary approach • Through detailed research and analysis of a particular topic in the compulsory Individual Project module requiring a multi-disciplinary approach.	• Assessed out-of-class and in-class course works. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations, and literature reviews • Written examinations • Project report(s), oral examination and writing of a journal-style paper
2.2	To increase the ability towards improvement of traffic control measures and traffic management.		
2.3	To formulate relevant analysis and to derive the solutions for them.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Increasing the ability to understand transportation planning and traffic engineering.	• Through lectures, tutorials, coursework and group project work. • Through supervised laboratory exercises following standard procedures • Through supervised outdoor practical work • Through supervised computer based laboratory exercises.	• Assessed out of class and in-class coursework. (Laboratory and fieldwork reports, modelling calculations) • Project reports and peer review of individual contributions to group work • Observation by tutors during laboratory and fieldwork activities
3.2	Overcoming the problems of transportation planning and traffic engineering.		
3.3	Preparing our graduates for immediate employment in any primary branch of civil engineering.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Developing the sensitivity of the students to transportation planning and traffic engineering.	• Through lectures, module notes, tutorials, coursework, examinations and group project work. • Through detailed research and analysis of a particular topic in the compulsory Individual Project module	• Assessed out of class and in-class coursework. Course works may be in the form of: laboratory and fieldwork reports, essays, in-class tests, design calculations and literature review.
4.2	Developing the ability of students to do transportation planning and traffic engineering studies using both basic		

	principles and modern engineering tools.	requiring a multi-disciplinary approach • Through supervised laboratory exercises following standard procedures • Through supervised field work.	• Written examinations • Project reports, oral and writing of a journal-style paper • Peer review of individual contributions to group work
4.3	Preparing our graduates to work effectively in modes ranging from independent study to multi-disciplinary teams.		
5.0	**Psychomotor**		
5.1	-	-	-
5.2	-	-	-

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework	Bi-weekly	10%
2	Quizzes	Bi-weekly	15%
3	Term Project	Weeks 6-8	10%
4	Midterm Exam	Week 8	25%
5	Final Exam	Week 17	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- All faculty has allocated tutorial or consultation hours during which the concerned teaching staff is available to provide academic advising to students.
- Generally, five hours are allocated per week and displayed outside office of the concerned teaching staff to facilitate advising to the students.

E. Learning Resources

1. List Required Textbooks • John J. Coyle, et al, Management of Transportation, Cengage Learning, Canada, 2011.
2. List Essential References Materials (Journals, Reports, etc.) • Nicholas A. Garber & Lester A. Hoel, “Traffic and Highway Engineering”, Cengage Learning, USA, 2010. • F.L. Mannering, S.S. Washburn and W.P. Kilareski, "Principles of Highway Engineering and Traffic Analysis" 4th Edition, John Wiley & Sons, Washington D.C, 2009. • Transportation Research Board, “Highway Capacity Manual”, National Research council, Washington, D.C., 2009.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • AASHTO - Guide for High-Occupancy Vehicle (HOV) Facilities, 3rd Edition
4. List Electronic Materials(eg. Web Sites, Social Media, Blackboard, etc.) • http://www.sciencedirect.com. • http://www.trb.org/Main/Home.aspx
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. • Latest Traffic Engineering Software

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Classroom for about 40 students, with white board, computer, projector and internet. **Library:**

The University Library provides advanced support for student learning in a purpose-built building and electronically via the web. It is open for upwards of 80 hours per week during semester and holds a stock of more than half a million volumes and an extensive serials collection. Numerous PC workstations (100+), networked printing facilities and self-service photocopiers are also available. The Library catalogue is available on-line, as are electronic versions of reading lists. Over 180 subject-specific electronic databases can be accessed by users both on campus and elsewhere. The Library organizes induction sessions for first year students and librarians can provide flexible training for students and researchers throughout their time. User support is also available from the Library information desks, via printed and online guides and through a series of 'Lunchtime in the Library' and other training sessions. There are a variety of study environments in the Library, including individual and group study desks and group study rooms.

Engineering Education Centre:

The Engineering Education Centre supports the implementation of innovative Teaching and Learning Methods into the curriculum, within the Faculty of Engineering, via the use of appropriate technologies. The Centre provides a focus for computer based learning and teaching activities in the Engineering Faculty, unlimited advice on Computer aided learning/assessment and distance learning materials, a limited amount of free software development time, and help to secure funding and manage projects relevant to learning and teaching.

Counselling Service and English Language Study Unit:

The Counselling Service and English Language Study Unit are able to support individual students in resolving problems and in improving communication skills for international students.

2. Computing resources (AV, data show, Smart Board, software, etc.)

Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The

University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) A white board & Computer with internet and data show. Computing Services provides the University IT facilities and infrastructure. General purpose computer resources across campus are open 24 hours and more specialist computer laboratories are provided in partnership with departments. Students in halls of residence are supported in connecting their computers to the high speed network. The University's virtual learning environment "LEARN" provides on and off campus access to web-based teaching materials provided by lecturing staff.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching • The Faculty must has an Associate Dean for Teaching responsible for all learning and teaching matters. For each Faculty there is a Directorate (responsible for the allocation of resources) and a Board (responsible for monitoring quality issues within each department). Support is provided by Professional Development. Student feedback on modules and program is sought at regular intervals, individual programs are reviewed annually, and Departments review their full portfolio of program as part of a Periodic Program Review (every five years). • Minor changes to module specifications are approved by the Associate Dean (Teaching) on behalf of the Faculty Board, and ratified by the University Curriculum Sub-Committee in accordance with the University's quality procedures. Major changes are formally considered by the University Curriculum Sub-Committee. • All staff participate in the University's staff appraisal scheme, which helps to identify any needs for staff skills development. Both probationary staff and those seeking promotion to Senior Lecturer are subject to a formal teaching evaluation scheme.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor • New lecturers attend a personalized programme of courses and, in the final year of probation, they assess their teaching through direct observation and a portfolio. • Professional Development works directly with staff who wish to develop more effective teaching and learning methods - including the area of learning technologies - and provides resources to support the learning skills development of students. • Other development opportunities are provided in institutional strategic priority areas and in response to discussions with departments in the context of their needs.

- Lectures
- Tutorial
- Survey Lab
- Class Activity

3 Processes for Improvement of Teaching

- Increasing the number of computers.
- E- learning
- Field applications must be completed
- Additional training for the staff assist.
- Scanning electron microscope.
- Multi-media facility (video projector, TV, etc.,).

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- Check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Shortage of computer systems and modern lab facilities must be solved
- Unavailability of technical staff must be solved
- Time is not enough must be solved
- Too many topics must be solved
- In-adequate experimental setup must be solved

Faculty or Teaching Staff: Dr. Mohammad Alawi

Signature: _____ **Date Report Completed:**

Received by: _____ **Dean/Department Head**

Signature: _____ **Date:** _____

COURSE SPECIFICATIONS

Form

Course Title: GIS and ITS Applications in Transportation Engineering

Course Code: 803658-3

Date: 2018-10-19.	**Institution: Umm Al-Qura University**
College: College of Engineering& Islamic Architecture	**Department: Civil Engineering**

A. Course Identification and General Information

1. Course title and code: **GIS and ITS Applications in Transportation, 803658-3**
2. Credit hours: **3**
3. Program(s) in which the course is offered. **Civil Engineering Department**

   (If general elective available in many programs indicate this rather than list programs)

   Master Program in Transportation Engineering
4. Name of faculty member responsible for the course: **Eng. Sajjad Memoon**
5. Level/year at which this course is offered: **Level 1 / 1st Year**
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any)
8. Location if not on main campus
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	✓	What percentage? 100
b. Blended (traditional and online)		What percentage?
c. E-learning		What percentage?
d. Correspondence		What percentage?
e. Other		What percentage?

Comments:

B Objectives

1. The main objective of this course

To give the students the knowledge and skills in basic methods for collection of geographic data for production and presentation of maps as well as for the solution of geographic analyses using GIS software.

By the end of this course students will be expected to understand:

- The diverse ways in which spatial data and GIS analyses are applied to help people better understand the world around them.
- Sourcing, editing and using spatial data in the transportation applications.
- Good practice for managing spatial data.
- The definition of projections, datum's and coordinate systems, and how knowledge of these allows different data sources to be mapped together.
- The importance of metadata to record the source of data, and the degree of precision and uncertainty of spatial or attribute data.
- The difference between raster and vector data formats, and the advantages and disadvantages of each.
- The difference between a GIS layer and the data it represents.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

- Increasing the number of computers.
- E- learning
- Increased use of IT or web based reference material,
- Changes in content as a result of new research in the field

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

Covers the basic concepts of Geographic Information Systems and Intelligent Transportation System, the methods and software used to implement them, and their applications in highway alignment selection, geometric design, data management and traffic operations in Transportation Engineering.

1. Topics to be Covered		
List of Topics	**No. of Weeks**	**Contact Hours**
Spatial data and Geographic Information Systems.	1	3
The need for spatial data, maps and GIS uses in Transportation Engineering	1	3
Spatial reference systems: studying the reference of the spatial location of objects on the earth's surface, and understanding how this translates to locations on a flat map.	1	3
Representing spatial features: Grasp the difference between discrete spatial objects and continuous surfaces, and learn the characteristics of the two primary data formats (vector and raster) which represent them.	2	6
Interpreting maps: Interpret the symbols, contours and scale on a topographic map.	2	6
Working with raster layers: Experience the power of remotely sensed imagery to visualize environmental patterns.	2	6
Working with vector layers: Generate and edit your own vector data by hand-digitizing, and add non-geographic information to your new layers.	2	6
Introduction to symbology and cartography: Exploring the art of cartography, Changing the way map features are displayed to identify spatial patterns for specific applications.	1	6
Making maps: Studying the key elements of a map (scale bar, legend, graticule) for interpretation of the map, applying cartographic principles in for specific applications.	1	3
Use of Digital Elevation Models in Selection and Optimization of highway Alignments, use of GIS and ITS in advance traffic, public transit and freight management systems.	2	6

2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual						
Credit	Planned	3					3
	Actual						

3. Individual study/learning hours expected for students per week. 3

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column.

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	To describe the main aspects of GIS and its major application areas.	• Lectures and training tutorials • Through group project work	• Class works. • Written and oral examinations. • Projects. • Reports.
1.2	To recognize the spatial reference systems, vector and raster layers, making maps and spatial analysis.		
1.3	To recognize the different applications of GIS in surveying.		
1.4	To describe the advantages and disadvantages of using spatial data, maps and GIS.		
2.0	**Cognitive Skills**		

2.1	To explain the main aspects of spatial data, maps and GIS.	• Lectures and training tutorials • Through group project work	• Class works. • Written and oral examinations. • Projects. • Reports.
2.2	To explain the Spatial reference systems and their using for representing spatial features.		
2.3	To summarize the difference between vector and raster layers for representing the spatial data.		
2.4	To explain the spatial analysis for discovering the utility of GIS that extends far beyond map-making, exploring concepts in spatial analysis that allows to create new data, identify patterns, and support future decision-making.		
2.5	To summarize the application fields of GIS especially in surveying.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	To show and evaluate the methods of spatial data, maps and GIS	• Group assignments. • Small group work.	• Class works. • Written and oral examinations. • Projects. • Reports.
3.2	To illustrate and analyze the data and information and overcoming the problems		
3.3	To act professionally and ethically in a team work.		
4.0	**Communication, Information Technology, Numerical**		
4.1	To operate effectively in civil engineering team work.	• Lectures and training tutorials • Through group project work	• Class works. • Written and oral examinations. • Projects.
4.2	To illustrate professional written reports, maps, and deliver		

	professional oral and written presentations.	• Through detailed research and analysis of a particular topic for photogrammetric applications	• Reports.
4.3	To prepare our graduates to work effectively in modes ranging from independent study to multi-disciplinary teams.		
5.0	**Psychomotor**		
5.1	Not applicable	Not applicable	Not applicable

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	First exam	4	15 %
2	Second exam	8	15 %
3	Third Exam	12	20 %
4	Final Exam	16 /17	50 %

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

- All faculty has allocated tutorial or consultation hours during which the concerned teaching staff is available to provide academic advising to students.
- Generally, five hours are allocated per week and displayed outside office of the concerned teaching staff to facilitate advising to the students.
- New lecturers attend a personalised programme of courses and, in the final year of probation, they assesses their teaching through direct observation and a portfolio.
- Professional Development works directly with staff who wishs to develop more effective teaching and learning methods - including the area of learning technologies - and provides resources to support the learning skills development of students.

E Learning Resources

1. List Required Textbooks • Harvey, F., 2008. A PRIMER OF GIS: Fundamental Geographic and Cartographic Concepts. The Guilford Press, A Division of Guilford Publications, Inc. 72 Spring Street, New York, NY 10012, USA.
2. List Essential References Materials (Journals, Reports, etc.) • J.J. Coyle, et al, Management of Transportation, Cengage Learning, Canada, 2011. • Geomatics Research Australasia. Institution of Surveyors, Australia, Canberra. QB301 .A87 • ITC Journal. The International Institute for Aerial Survey and Earth Sciences, Enschede. TA593 .I54 • Journal of Spatial Science. Spatial Sciences Institute Australia. Perth. G70.212 .J68 • Photogrammetric Record. Photogrammetric Society, London. TR693 .P46 • Photogrammetric Engineering and Remote Sensing. American Society of Photogrammetry, Falls Church. TA593 .P54
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc. • Websites of GIS and Spatial data.
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software. • Latest Software and Techniques for CAD and GIS.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • Classroom to accommodate 15 students equipped with usual blackboard or smart board. • Computer laboratory equipped with hardware and software.
2. Technology resources (AV, data show, Smart Board, software, etc.) • Computers connected to internet and equipped with required software. • Printers. • Data show for some work presentation.

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching • Student questionnaire at the end of the semester. • Student test result analysis. • Regular feedback from students.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Regular review of the course contents by the related department committee. • Input from visiting professors.

3. Procedures for Teaching Development • Regular updating of learning resources. • Usage of new technologies in presenting the course materials. • Self-learning. • Promote reading of outside materials. • Encouraging students to conduct scientific presentations and group discussions. • Additional training for the staff assist.
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) • Check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution • A review of a sample of student answers by a related department committee. • In-department group review and marking. • External reviewer for a sample of student answering sheets.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. • Regular updating of learning resources. • Usage of new technologies in presenting the course materials. • Regular review of the course content by the related department committee. • Input from external and internal reviewers.

Name of Course Instructor: Dr. Hasan Tayyeb

Signature: _____ **Date Completed:** _____

Program Coordinator: _____

Signature: _____ **Date Received:** _____