Course Specification

Course Title	Sanitary Chemistry	
Course Code	CPW 608	
Academic Year	2018-2019	
Coordinator	Dr. Mohamed Ayoub	
Teaching Staff	Dr. Mohamed Ayoub	
Branch / Level	Post graduate- Master Course	
Semester	Credit hours system	
Pre-Requisite	-	
Course Delivery	**Lecture**	**14 x2 h lectures**
	Tutorial	**14 x2 h tutorial**
Parent Department	Public Works Engineering Department	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Enhance the protection of the environment.
- Enable to deal with the chemical analyses for water and wastewater.
- Acquire high experience in the analytical techniques for water quality.
- Understand the chemical reactions, equations, solutions, sampling for water quality control.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

By the end of this course students should be able to:

a1- Mention water characteristics.

a2- List the indicators of water quality and its measurements.

a3- Define indicator impurities for water quality.

a4- Illustrate the different instruments used for experimental tests.

B. Intellectual skills:

By the end of this course, the students should be able to:

b1- Apply the chemical and biological reactions in water and wastewater treatment.

b2- Expose the different concentrations of materials such as sulfate, nitrogen, chlorine.

C. Professional and practical skills:

By the end of this course, the students should be able to:

c1- Design an experimental program for testing of water quality.

c2- Collect the practice of different experiments for measurements of pH, turbidity, BOD, COD, TDS,TOC, DO…..etc.

D. General and transferable skills:

By the end of this course, the students should be able to:

d1-Communicate with updating of engineering applications.

d2-Work under pressure.

3. Course Contents

Week	Topics
1	Introduction to water characteristics

2,3	Measurement of water quality
4	Hydrogen ion concentration
5	Gas solubility
6	Alkalinity
7	Phosphate
8	sulfate
9	Nitrogen
10	Hardness
11	Dissolved oxygen
12	Chlorine
13	Iron and manganese- Heavy metals
14	Biological oxygen demand - Chemical oxygen demand

4. Teaching and Learning Methods

4.1- Lectures.
4.2- Lab and practical exercises.

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3h	On week 16	60%
Oral Assessment	-	-	-
Practical Examination	-	-	20%
Semester work	4h (overall)	On week 2,3,4,6,10,13	20%

Attendance is essential in all tutorial classes. If anyone will not be able to attend a class he should inform the instructor beforehand in order to obtain assignments.

6. List of references

Course notes:
Essential Books:

- Good practices in urban Water management: decoding good practices for a Successful Future" ed. by Anand Chiplunkar, Kallidaikurichi Seetharam, Cheon Kheong Tan. 2012, ADB, National University of Singapore.
- Water and Wastewater Engineering, 2010, McGraw-Hill Professional.
- Baruth, E.E., (2005)." Water Treatment Plant Design" .AWWA, ASCE, 4th edition, MC Graw-Hill.
- WHO. 2004. Guidelines for Drinking-water Quality, 3rd edition. World Health Organisation.
- WHO. 2004. Safe Piped Water : Managing Microbial Water Quality in Piped Distribution Systems, Richard Ainsworth (ed.) IWA.
- Basiouny,M.,(2000)." Sewerage, Theory, Design Criteria, and Solved Examples" . BHIT, Egypt.
- Basiouny,M.,(2000)." Water Supply, Theory, Design Criteria, and Solved Examples" . BHIT, Egypt.
- Crites, R., and G. Techobanoglous. (1998), Small and Decentralized wastewater management System, McGraw Hill series, International Edition.

- Harrison, R.M (edited by). Understanding Our Environment, An Introduction to Environmental Chemistry and Pollution, Third Edition. Royal Society of Chemistry. 1999.
- Metcalf and eddy, inc. (2003), wastewater engineering: treatment Disposal and Reuse, McGraw Hill series, International Edition.
- Schulz, R.C. and Okuh, (1992), surface water treatment for communities in Developing countries, International Technology Publication.
- vanLoon, Gary W.; Duffy, Stephen J. (2000). Environmental Chemistry. Oxford: Oxford. pp. 7.
- Vigneswaran, S. and Visvanathan, C. (1995), water treatment processes. CRC Press.
- Williams, Ian. Environmental Chemistry, A Modular Approach. Wiley. 2001..

Web sites- Periodicals … etc:

- www.huntsman.com/tioxide
- www.aquaoffice.de/downlaod/HandbuchAd.pdf
- www.owp.csus.edu/WTOP1.html
- www.ovivowater.com
- www.glv.com
- www.wrc.org.za
- Water research
- Journal of environmental engineering
- Water science and technology

7. Facilities required for teaching and learning

- White board.
- Portable display screen.
- Sanitary Lab facilities.

	Course Coordinator	Head of Department
Name	Dr. Mohamed Ayoub	Prof .Dr. Hafez Abbas Afify
Name (Arabic)	محمد عبدالسلام أيوب	أ.د. حافظ عباس عفيفي
Signature		
Date	/ /2018	/ /2018

Course Specification

Course Title	Application of Remote Sensing	
Course Code	CPW 616	
Academic Year	2017-2018	
Coordinator	Prof. Dr / Hafez Abbas Afify	
Teaching Staff	Prof. Dr / Hafez Abbas Afify	
Branch / Level	Civil Engineering	
Pre-Requisite	-	
Course Delivery	**Lecture**	**2 h lecture**
	Practical	**2 h practical**
Parent Department	Civil Engineering	
Date of Approval		

1. Course Aims

1 – Overall Aims of Course

Remote sensing is a powerful set of software and hardware, computer-based techniques for extraction and presentation of information represented by raster and vector spatial data acquired via non-contact sensors. It provides reliable and cost-effective means of studying the environment for protection, natural resources management and urban planning. Government and non-government organizations continuously seek qualified professionals to use remote sensing for a wide range of applications. This course will focus on the applications of remote sensing in some important areas of the earth system studies. For each application area, there will be two parts: a) the nature of the problem and the theoretical bases of the applicable techniques and b) review and discussion of actual application examples, including methodology, implementation procedures, results, discussions, and conclusions. At the end of this course the student should has the ability to do the following:

- To understand the physical basis of remote sensing; these include spectral, temporal, spatial and resolution properties, the spectrum and its radiation and reflectance properties and image properties.
- To understand the characteristics of the different earth observation satellite systems and their different types of data products.
- Recognize the active and passive remote sensing systems.
- To utilize and assess different types of digital imagery and digital image processing (radiometric, geometric corrections of digital imagery and different classification procedures)
- To be able to use remote sensing images and related techniques and analyze in relation to civil engineering applications.
- To improve the ability to design and conduct experiments as well as analyze and interpret data.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

By the end of this course students should be able to:

a1- Explain the remote sensing fundamentals, including remote sensing data collection and processing, electromagnetic radiation principles and energy-matter interaction.

a2- Illustrate the characteristics of the different earth observation satellite systems.

a3- Define the active and passive remote sensing

a4- Explain how different portions of the electromagnetic spectrum can be used in environmental remote sensing

B. Intellectual skills:

By the end of this course, the students should be able to:

b1- Apply the application of imagery to a wide range of applications.

b2- Analyze the issues related to the environment and application of imagery to solve problems..

b3- Apply the pre and post enhancements on digital images if necessary.

C. Professional and practical skills:

By the end of this course, the students should be able to:

c1- Perform image processing using image processing software.

c2- Diagnose the policies for acquiring, distributing and applying data for the benefit of the society.

c3- Perform aspects examination of the environment, including water, crop monitoring, planning and environmental resources management, change detection applications, and land use and land cover mapping, using the remote sensing.

c4- Perform accuracy assessment and change detection.

D. General and transferable skills:

By the end of this course, the students should be able to:

d1- Use computer resources and information technology.

d2- Manage the various mapping products which most frequently used in different engineering applications

d3- Work in team while performing critical analyses in relation to civil engineering.

3. Course Contents

Topic No.	Topic	Total No. of hours	No. of hours	
			Lecture	Tutorial/ Practical
1	The physical basis of remote sensing	8	4	4
2	Positive and negative systems	8	4	4
3	Satellite remote sensing systems	8	4	4
4	Digital image processing (radiometric, geometric and classification	8	4	4

5	Production of topographic maps, digital terrain models and ortho-images	8	4	4
6	Remote sensing applications(crop monitoring, planning and environmental resources management, change detection applications, land use and land cover mapping	12	6	6
7	Integration with geographic information systems	4	2	2
8	Non-classical applications for remote sensing systems.	4	2	2

4– Teaching and Learning Methods

4.1- Lectures.
4.2- Problems solution in theoretical exercises.
4.3- Use of computer in geodetic computations and GPS.
4.4-Use of the internet for relevant engineering applications and case studies

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3h	On week 16	60%
Labs and practical Exam	1h	On week 14	20%
Oral Examination	-	-	-
Semester work (Assignments)	5hours (overall)	On week3,5,9	20%

6- List of References

6.1- Essential Books (Text Books)

- Jensen, John R., 2008. “Introductory Digital Image Processing, A Remote Sensing Perspective”, Englewood Cliffs, New Jersey, Prentice-Hall.
- Lillesand, T. M. and Kiefer, R. W., 2005. “Remote Sensing and Image Interpretation”, New York.
- Richards, J. A. 2004. “Remote Sensing Digital Image Analysis an Introduction”, Springer, Germany.
- Wolf, Paul R., Elements of Photogrammetry: with applications in GIS, 3rd ed., Boston, Mass.; London: McGraw-Hill. 2000.
- Gary L. Prost, "Remote Sensing for Geoscientists: Image Analysis and Integration", CRC Press, 2013.

6.2- Periodicals, Web Sites, etc

- To be cited during the course

7- Facilities Required for Teaching and Learning

- Remote sensing laboratory
- Portable display screen.
- PC computers

	Course Coordinator	Head of Department
Name	Prof. Dr/ Hafez Abbas Afify	Prof. Dr/ Hafez Abbas Afify
Name (Arabic)	أ.د. حافظ عباس عفيفي	أ.د. حافظ عباس عفيفي
Signature		
Date	/ /2018	/ /2018

Course Specification

Course Title	Transport modeling	
Course Code	CPW630	
Academic Year	2018-2019	
Coordinator	Dr. Ahmed Mohamed Alkafoury	
Teaching Staff	Dr. Ahmed Mohamed Alkafoury	
Branch / Level	Level 600	
Semester	-	
Pre-Requisite	-	
Course Delivery	**Lecture**	**14 x2 h lectures**
	Tutorial	**14 x2 h tutorial**
Department offering the Course	Public Works Engineering Department	

1. Course Aims

By the end of this course students should be able to:

- Define the method of demand forecasting.
- Explain different models related to transport.
- Use the applications of transport models.
- Use the calibration of demand models.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

By the end of this course students should be able to:

a1- Explain methods of demand forecasting, including trends and extrapolation, category analysis, economic models, land use models, and gravity models.

a2- Tell sufficient information about the different transport models, such as travel demand models, trip generation models, trip distribution models, modal split models, trip assignment models.

a3- Describe the applications of models and the calibration of demand models.

B. Intellectual skills:

By the end of this course, the students should be able to:

b1- Suggest build and solve the transportation models, including travel demand models, trip generation models, trip distribution models, modal split models, trip assignment models.

b2- Compare different applications of transport models; inter-city, urban, international, and regional.

b3- Plan the calibration of the demand models, including the multiple regression, and error analysis.

C. Professional and practical skills:

By the end of this course, the students should be able to:

c1-Design and solve the transportation models.

c2- Perform applications of models with their different aspects; inter-city, urban, international, and regional.

D. General and transferable skills:

By the end of this course, the students should be able to:

d1- Work under pressure.

d2- Use computer resources and information technology.

d3- Work in team while performing critical analyses in relation to civil engineering.

.

3. Course Contents

Topic No.	Topic	Total No. Of hours	No. Of Hours	
			Lecture	Tutorial/ Practical
1	Method of demand forecasting.	8	4	4
2	Travel demand models.	8	4	4
3	Trip generation models.	8	4	4
4	Trip distribution models.	4	2	2
5	Modal split models.	8	4	4
6	Trip assignment models.	8	4	4
7	Applications of models.	8	4	4
8	Calibration of demand models.	4	2	2

4– Teaching and Learning Methods

4.1- Lectures.
4.2- Problems solution in theoretical exercises.
4.3- Labs facilities and software.

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3h	On week 16	60%
Oral Assessment	-	-	20%

Practical Examination	-	-	20%
Semester work	5h (overall)	On week 2,3,5,7,9,10,11,13	40%

6- List of References

- Essential Books (Text Books)

-Transportation engineering. Upadhyay, 2009.

-Transportation Eng. & planning. Papacostas, 2005.

- Periodicals, web sites, ... etc.

7- Facilities Required for Teaching and Learning

- Portable display screen.

	Course Coordinator	**Head of Department**
Name	Dr. Ahmed Mohamed Alkafoury	Prof. Dr/ Hafez Abbas Afify
Name (Arabic)	**د.احمد محمد الكافوري**	**أ.د. حافظ عباس عفيفي**
Signature		
Date	/ /2018	/ /2018

Course Specification

Course Title	Transport systems and traffic engineering	
Course Code	CPW 634	
Academic Year	2018-2019	
Coordinator	Dr. Ahmed Mohamed Alkafoury	
Teaching Staff	Dr. Ahmed Mohamed Alkafoury	
Branch / Level	Level 600	
Semester	-	
Pre-Requisite	-	
Course Delivery	**Lecture**	**14 x2 h lectures**
	Tutorial	**14 x2 h tutorial**
Department offering the Course	Public Works Engineering Department	

1. Course Aims

By the end of this course students should be able to:

- Explain transport modes and their characteristics.
- Analyze the traffic surveys.
- Evaluate the traffic characteristics and the traffic control systems.
- Suggest plans for traffic safety, and the traffic management.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

By the end of this course students should be able to:

a1- Describe different transport modes and their characteristics, including the railways, road transport, air transport, water transport, and pipe transport.

a2- Tell the traffic characteristics and service level.

a3- Define the concepts of traffic control systems, traffic safety, and traffic management.

B. Intellectual skills:

By the end of this course, the students should be able to:

b1- Formulate knowledge about required traffic surveys and analysis, this includes the traffic flow between and at intersections, speeds and delays, and parking.

b2- Analyze the transport modes and their characteristics, including the railways, road transport, air transport, water transport, and pipe transport..

b3- Plan traffic control systems, traffic safety, and traffic management.

C. Professional and practical skills:

By the end of this course, the students should be able to:

c1- Diagnose the traffic flow between and at intersections, speeds and delays, and use the data in traffic surveys and analysis.

c2- Design the traffic capacity and determine the service level and other traffic characteristics.

D. General and transferable skills:

By the end of this course, the students should be able to:

d1- Work under pressure.

d2- Use computer resources and information technology.

d3- Work in team while performing critical analyses in relation to civil engineering.

3. Course Contents

Topic No.	Topic	Total No. Of hours	No. Of Hours	
			Lecture	Tutorial/ Practical
1	Transport modes and their characteristics.	8	4	4
2	Traffic surveys and analysis (traffic flow between and at intersection .	16	8	8
3	Traffic characteristics.	8	4	4
4	Traffic control systems.	8	4	4
5	Traffic safety.	8	4	4
6	Traffic management.	8	4	4

4– Teaching and Learning Methods

4.1- Lectures.
4.2- Problems solution in theoretical exercises.
4.3- Labs and practical exercises.

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3h	On week 16	60%
Labs and practical Exam	1h	On week 14	20%
Oral Examination	-	-	-
Semester work (Assignments)	5hours (overall)	On week3,5,9	20%

6- List of References

- Essential Books (Text Books)

-Intro. To transportation eng. And planning. Morlok.

-Principles of transportation engineering. Chakraborty, 2012.

-Traffic Eng. Roess, 2004.

- Periodicals, web sites, ... etc.

7- Facilities Required for Teaching and Learning

- Portable display screen.

	Course Coordinator	Head of Department
Name	Dr. Ahmed Mohamed Alkafoury	Prof. Dr/ Hafez Abbas Afify
Name (Arabic)	د. احمد محمد الكافوري	أ.د. حافظ عباس عفيفي
Signature		
Date	/ /2018	/ /2018

Course Specification

Course Title	Equilibrium of transport networks	
Course Code	CPW635	
Academic Year	2018-2019	
Coordinator	**Dr. Islam abou Elnaga**	
Teaching Staff	**Dr. Islam abou Elnaga**	
Branch / Level	Level 600	
Semester	-	
Pre-Requisite	-	
Course Delivery	**Lecture**	**14 x2 h lectures**
	Tutorial	**14 x2 h tutorial**
Department offering the Course	Public Works Engineering Department	

1. Course Aims

By the end of this course students should be able to:

- Define different concepts of equilibrium of transport network.
- Apply the network representation, the network user equilibrium, the basic concepts in minimization of problems, and formulating the assignment problems as a mathematical problem.
- Perform some optimization algorithms, the solving of user equilibrium, user equilibrium with variable demand, combination of trip distribution, traffic assignment, and modal split models.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

By the end of this course students should be able to:

a1- Describe network representation and the network user equilibrium.

a2- Mention the basic concepts in minimization of problems of transport networks.

a3- Explain the review of some optimization algorithms.

B. Intellectual skills:

By the end of this course, the students should be able to:

b1- Formulate knowledge about formulating the assignment problems as a mathematical problem.

b2- Apply traffic assignment, and modal split models.

b3- Analyze the combination of trip distribution.

C. Professional and practical skills:

By the end of this course, the students should be able to:

c1- Design the assignment problems as a mathematical problem.

c2- Perform the network user equilibrium.

c3- Perform the network user equilibrium with variable demand.

D. General and transferable skills:

By the end of this course, the students should be able to:

d1- Work under pressure.

d2- Use computer resources and information technology.

d3- Work in team while performing critical analyses in relation to civil engineering.

3. Course Contents

Topic No.	Topic	Total No. Of hours	No. Of Hours	
			Lecture	Tutorial/ Practical
1	Network representation.	4	2	2
2	Network user equilibrium.	4	2	2
3	Basic concepts in minimization of problems.	4	2	2
4	Formulating of assignment problems as mathematical problems.	8	4	4
5	Review of some optimization algorithms.	8	4	4
6	Solving of user equilibrium.	8	4	4
7	User equilibrium with variable demand.	4	2	2
8	Combination of trip distribution.	4	2	2
9	Traffic assignment.	8	4	4
10	Modal split models.	8	4	4

4– Teaching and Learning Methods

4.1- Lectures.
4.2- Problems solution in theoretical exercises.
4.3- Labs facilities and software.

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3h	On week 16	60%
Oral Assessment	-	-	20%
Practical Examination	-	-	20%
Semester work	5h (overall)	On week	40%

		2,3,5,7,9,10,11,13	

6- List of References

- Essential Books (Text Books)

-Transportation Eng. Upadhyay, 2004.

-Transportation Eng. And planning. Papacostas, 2005.

- Periodicals, web sites, ... etc.

7- Facilities Required for Teaching and Learning

- Portable display screen.

	Course Coordinator	**Head of Department**
Name	Dr. Islam abou Elnaga	Prof. Dr/ Hafez Abbas Afify
Name (Arabic)	**د. اسلام ابو النجا**	**أ.د. حافظ عباس عفيفي**
Signature		
Date	/ /2018	/ /2018

Course Specification

Course Title	Water Purification	
Course Code	CPW 643	
Academic Year	2018-2019	
Coordinator	Dr. Abd El-Aziz Elsayed	
Teaching Staff	Dr. Abd El-Aziz Elsayed	
Branch / Level	Post graduate- Master Course	
Semester	Credit hours system	
Pre-Requisite	-	
Course Delivery	**Lecture**	**14 x2 h lectures**
	Tutorial	**14 x2 h tutorial**
Parent Department	Public Works Engineering Department	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Enhance the protection of the environment.
- Enable to deal with the chemical analyses for water and wastewater.
- Acquire high experience in the analytical techniques for water quality.
- Understand the chemical reactions, equations, solutions, sampling for water quality control.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

By the end of this course students should be able to:

a1- Explain principles of environmental engineering management and design pertaining to water purification and environmental impact assessment.

a2- Illustrate the methods of population projection, water consumption, suitable source of water and its suggested treatment, and economical benefits.

a3- Review laws for allocation of surface and groundwater supplies, and reviews environmental law.

B. Intellectual skills:

By the end of this course, the students should be able to:

b1- Suggest the most appropriate water treatment technology and applying the best method of design for all of each constitute Creating detailed drawing containing all its different features.

b2- Evaluate the performance of water treatment plants.

C. Professional and practical skills:

By the end of this course, the students should be able to:

c1- Perform the methods of protecting public health.

c2- Protect environment from degradation or contamination.

c3- Reduce costs of water treatment by using optimum method of design.

c4- Design and construct different types of water treatment plant.

D. General and transferable skills:

By the end of this course, the students should be able to:

d1- Use water quality tests in the field of water treatment.

d2- Update skills in water treatment technology.

3. Course Contents

Week	Topics
1	Water resources
2	Portability of water
3	Drinking water standards
4	Ground water
5	Surface water collection works
6	Low lift units
7	Sedimentation processes
8	Water filtration
9	Water disinfections

4. Teaching and Learning Methods

4.1- Lectures.
4.2- Labs and practical exercises.

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3h	On week 16	60%
Oral Assessment	-	-	-
Practical Examination	-	-	20%
Semester work	4h (overall)	On week 2,3,4,6,8,9	20%

Attendance is essential in all tutorial classes. If anyone will not be able to attend a class he should inform the instructor beforehand in order to obtain assignments.

6. List of references

Course notes:
Essential Books:

- Good practices in urban Water management: decoding good practices for a Successful Future" ed. by Anand Chiplunkar, Kallidaikurichi Seetharam, Cheon Kheong Tan. 2012, ADB, National University of Singapore.
- Water and Wastewater Engineering, 2010, McGraw-Hill Professional.
- Baruth, E.E., (2005)." Water Treatment Plant Design" .AWWA, ASCE, 4th edition, MC Graw-Hill.

- WHO. 2004. Guidelines for Drinking-water Quality, 3rd edition. World Health Organisation.
- WHO. 2004. Safe Piped Water : Managing Microbial Water Quality in Piped Distribution Systems, Richard Ainsworth (ed.) IWA.
- Basiouny,M.,(2000)." Water Supply, Theory, Design Criteria, and Solved Examples" . BHIT, Egypt.
- American Public Health Association, American Water Works Association, and Water Pollution Control Federation, (1989) Standard Methods for the Examination of Water and Wastewater, 17th Edition..
- Metcalf and eddy, inc. (1972), water engineering: Collection treatment Disposal, McGraw Hill series, International Edition..
- Schulz, R.C. and Okuh, (1992), surface water treatment for communities in Developing countries, International Technology Publication.

Web sites- Periodicals … etc:

- www.huntsman.com/tioxide
- www.aquaoffice.de/downlaod/HandbuchAd.pdf
- www.owp.csus.edu/WTOP1.html
- www.ovivowater.com
- www.glv.com
- www.wrc.org.za
- Water research
- Journal of environmental engineering
- Water science and technology

7. Facilities required for teaching and learning

- Portable display screen.
- Sanitary Lab facilities.
- White board.

	Course Coordinator	**Head of Department**
Name	Dr. Abd El-Aziz Elsayed	Prof .Dr. Hafez Abbas Afify
Name (Arabic)	د.عبدالعزيز السيد	أ.د. حافظ عباس عفيفي
Signature		
Date	/ /2018	/ /2018

Course Specification

Course Title	Wastewater Treatment	
Course Code	CPW 644	
Academic Year	2018-2019	
Coordinator	Dr. Mohamed elsmdon	
Teaching Staff	Dr. Mohamed elsmdon	
Branch / Level	Post graduate- Master Course	
Semester	Credit hours system	
Pre-Requisite	-	
Course Delivery	**Lecture**	**14 x2 h lectures**
	Tutorial	**14 x2 h tutorial**
Parent Department	Public Works Engineering Department	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Enhance the protection of the environment.
- Enable to deal with the chemical analyses for water and wastewater.
- Acquire high experience in the analytical techniques for water quality.
- Understand the chemical reactions, equations, solutions, sampling for water quality control.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

By the end of this course students should be able to:

a1- Explain principles of environmental engineering management and design pertaining to wastewater treatment and environmental impact assessment.

a2- Write about wastewater flows and characteristics, sewer system, primary treatment, biological wastewater treatment design theory and the limits of different design criteria.

B. Intellectual skills:

By the end of this course, the students should be able to:

b1- Suggest the most appropriate wastewater treatment technology and Apply the best method of design for all of each constitute Creating detailed drawing containing all its different features.

b2- Evaluate the performance of sewage treatment plants.

C. Professional and practical skills:

By the end of this course, the students should be able to:

c1- Perform the methods of protecting public health.

c2- Protect environment from degradation or contamination.

c3- Reduce costs of wastewater treatment by using optimum method of design.

c4- Design and construct different types of wastewater treatment plant.

D. General and transferable skills:

By the end of this course, the students should be able to:

d1- Use water quality tests in the field of wastewater treatment.

d2- Communicate with the updating of skills in wastewater treatment technology.

3. Course Contents

Week	Topics
1	Wastewater characteristics
2	Aerobic and anaerobic processes
3	Preliminary treatment
4	Primary treatment
5	Secondary treatment
6	Tertiary treatment
7	Biological filtration
8	Activated sludge
9	Stabilization ponds
10	Aerated lagoons

4. Teaching and Learning Methods

3.1- Lectures.
3.2- Labs and practical exercises.

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3h	On week 16	60%
Oral Assessment	-	-	-
Practical Examination	-	-	20%
Semester work	4h (overall)	On week 2,3,4,6,8,10	20%

Attendance is essential in all tutorial classes. If anyone will not be able to attend a class he should inform the instructor beforehand in order to obtain assignments.

6. List of references

Course notes:
Essential Books:

- Water and Wastewater Engineering, 2010, McGraw-Hill Professional.
- Metcalf and eddy, inc. (2003), wastewater engineering: treatment Disposal and Reuse, McGraw Hill series, International Edition..
- Basiouny,M.,(2000)." Sewerage, Theory, Design Criteria, and Solved Examples" . BHIT, Egypt.
- American Public Health Association, American Water Works Association, and Water Pollution Control Federation, (1989) Standard Methods for the Examination of Water and Wastewater, 17th Edition.

- Metcalf and eddy, inc. (1972), water engineering: Collection treatment Disposal, McGraw Hill series, International Edition.

Web sites- Periodicals … etc:

- www.huntsman.com/tioxide
- www.aquaoffice.de/downlaod/HandbuchAd.pdf
- www.owp.csus.edu/WTOP1.html
- www.ovivowater.com
- www.glv.com
- www.wrc.org.za
- Water research
- Journal of environmental engineering
- Water science and technology

7. Facilities required for teaching and learning

- Portable display screen.
- Sanitary Lab facilities.
- White board.

	Course Coordinator	Head of Department
Name	Dr. Mohamed elsmdon	Prof .Dr. Hafez Abbas Afify
Name (Arabic)	د.محمد السمدونى	أ.د. حافظ عباس عفيفي
Signature		
Date	/ /2018	/ /2018

Course Specification

Course Title	Advanced Studies In Water Purification	
Course Code	CPW 645	
Academic Year	2018-2019	
Coordinator	Dr. Abd El-Aziz Elsayed	
Teaching Staff	Dr. Abd El-Aziz Elsayed	
Branch / Level	Post graduate- Master Course	
Semester	Credit hours system	
Pre-Requisite	-	
Course Delivery	**Lecture**	**14 x2 h lectures**
	Tutorial	**14 x2 h tutorial**
Parent Department	Public Works Engineering Department	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Enhance the protection of the environment.
- Enable to deal with the chemical analyses for water and wastewater.
- Acquire high experience in the analytical techniques for water quality.
- Understand the chemical reactions, equations, solutions, sampling for water quality control.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

By the end of this course students should be able to:

a1- Explain principles of environmental engineering management and design pertaining to water purification and environmental impact assessment.

a2- Illustrate the methods of population projection, water consumption, suitable source of water and its suggested treatment, and economical benefits.

a3- Review laws for allocation of surface and groundwater supplies, and reviews environmental law.

B. Intellectual skills:

By the end of this course, the students should be able to:

b1- Suggest the most appropriate water treatment technology and applying the best method of design for all of each constitute Creating detailed drawing containing all its different features.

b2- Evaluate the performance of water treatment plants.

C. Professional and practical skills:

By the end of this course, the students should be able to:

c1- Perform the methods of protecting public health.

c2- Protect environment from degradation or contamination.

c3- Reduce costs of water treatment by using optimum method of design.

c4- Design and construct different types of water treatment plant.

D. General and transferable skills:

By the end of this course, the students should be able to:

d1- Manage the major components of engineering work.

d2-Work under pressure.

3. Course Contents

Week	Topics
1	Water characteristics
2	Surface water
3	Ground water and treated wastewater effluent
4	Organic and inorganic contaminants
5	Chemical sedimentation
6	Iron and manganese removal
7,8	Aeration – Filtration
9,10	Absorption – Hydro dialysis
11,12	Softening – Reverse osmosis

4. Teaching and Learning Methods

4.1- Lectures.
4.2- Labs and practical exercises.

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3h	On week 16	60%
Oral Assessment	-	-	-
Practical Examination	-	-	20%
Semester work	4h (overall)	On week 2,3,4,6,10,12	20%

Attendance is essential in all tutorial classes. If anyone will not be able to attend a class he should inform the instructor beforehand in order to obtain assignments.

6. List of references

Course notes:
Essential Books:

- Good practices in urban Water management: decoding good practices for a Successful Future" ed. by Anand Chiplunkar, Kallidaikurichi Seetharam, Cheon Kheong Tan. 2012, ADB, National University of Singapore.
- Water and Wastewater Engineering, 2010, McGraw-Hill Professional.
- Baruth, E.E., (2005)." Water Treatment Plant Design" .AWWA, ASCE, 4th edition, MC Graw-Hill.
- WHO. 2004. Guidelines for Drinking-water Quality, 3rd edition. World Health Organisation.
- WHO. 2004. Safe Piped Water : Managing Microbial Water Quality in Piped Distribution Systems, Richard Ainsworth (ed.) IWA.

- American Public Health Association, American Water Works Association, and Water Pollution Control Federation, (1989) Standard Methods for the Examination of Water and Wastewater, 17th Edition.
- Metcalf and eddy, inc. (1972), water engineering: Collection treatment Disposal, McGraw Hill series, International Edition..
- Schulz, R.C. and Okuh, (1992), surface water treatment for communities in Developing countries, International Technology Publication.

Web sites- Periodicals … etc:

- www.huntsman.com/tioxide
- www.aquaoffice.de/downlaod/HandbuchAd.pdf
- www.owp.csus.edu/WTOP1.html
- www.ovivowater.com
- www.glv.com
- www.wrc.org.za
- Water research
- Journal of environmental engineering
- Water science and technology

7. Facilities required for teaching and learning

- Portable display screen.
- White board.
- Sanitary Lab facilities.

	Course Coordinator	Head of Department
Name	Dr. Abd El-Aziz Elsayed	Prof .Dr. Hafez Abbas Afify
Name (Arabic)	د.عبدالعزيز السيد	أ.د. حافظ عباس عفيفي
Signature		
Date	/ /2018	/ /2018

Course Specification

Course Title	Water Sources Engineering	
Course Code	CPW 648	
Academic Year	2018-2019	
Coordinator	Dr. Abd El-Aziz Elsayed	
Teaching Staff	Dr. Abd El-Aziz Elsayed	
Branch / Level	Post graduate- Master Course	
Semester	Credit hours system	
Pre-Requisite	-	
Course Delivery	**Lecture**	**14 x2 h lectures**
	Tutorial	**14 x2 h tutorial**
Parent Department	Public Works Engineering Department	
Date of Approval		

1. Course Aims

The aims of this course are to:

- Enhance the protection of the environment.
- Enable to deal with the chemical analyses for water and wastewater.
- Acquire high experience in the analytical techniques for water quality.
- Understand the chemical reactions, equations, solutions, sampling for water quality control.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

By the end of this course students should be able to:

a1- Explain characteristics of different water resources.

a2- Define measurement of water discharge of channels and pipelines.

a3- Explain how to control of losses in water uses in domestic, industrial and irrigation purposes.

B. Intellectual skills:

By the end of this course, the students should be able to:

b1- Evaluate of different water resources.

b2- Integrate the alternative resources of fresh water.

C. Professional and practical skills:

By the end of this course, the students should be able to:

c1- Develop measurement of water discharge of channels and pipelines.

c2- Preserve control of losses in water uses in domestic – Industrial and irrigation purposes.

D. General and transferable skills:

By the end of this course, the students should be able to:

d1-Work under pressure.

d2-Communicate with updating of engineering application.

d3-Participate and compose team work.

.

3. Course Contents

Week	Topics
1	Rain water
2	Ground water
3	Surface water
4	Characteristics of different water resources
5	Measurement of water discharge of channels and pipelines
6	Alternative resources of fresh water
7	Control of losses in water uses in domestic
8	Industrial and irrigation purposes

4. Teaching and Learning Methods

4.1- Lectures.
4.2- Lab and practical exercises.

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3h	On week 16	60%
Oral Assessment	-	-	-
Practical Examination	-	-	20%
Semester work	4h (overall)	On week 2,3,4,6,7,8	20%

Attendance is essential in all tutorial classes. If anyone will not be able to attend a class he should inform the instructor beforehand in order to obtain assignments.

6. List of references

Course notes:
Essential Books:

- Good practices in urban Water management: decoding good practices for a Successful Future" ed. by Anand Chiplunkar, Kallidaikurichi Seetharam, Cheon Kheong Tan. 2012, ADB, National University of Singapore.
- Water and Wastewater Engineering, 2010, McGraw-Hill Professional
- WHO. 2004. Guidelines for Drinking-water Quality, 3rd edition. World Health Organisation.
- WHO. 2004. Safe Piped Water : Managing Microbial Water Quality in Piped Distribution Systems, Richard Ainsworth (ed.) IWA.
- Williams, Ian. Environmental Chemistry, A Modular Approach. Wiley. 2001..
- Harrison, R.M (edited by). Understanding Our Environment, An Introduction to Environmental Chemistry and Pollution, Third Edition. Royal Society of Chemistry. 1999.
- vanLoon, Gary W.; Duffy, Stephen J. (2000). Environmental Chemistry. Oxford: Oxford. pp. 7.
- Metcalf and eddy, inc. (1972), water engineering: Collection treatment Disposal, McGraw Hill series, International Edition.

Web sites- Periodicals ... etc:

- www.huntsman.com/tioxide
- www.aquaoffice.de/downlaod/HandbuchAd.pdf
- www.owp.csus.edu/WTOP1.html
- www.ovivowater.com
- www.glv.com
- www.wrc.org.za
- Water research
- Journal of environmental engineering
- Water science and technology

7. Facilities required for teaching and learning

- Portable display screen.
- Sanitary Lab facilities.
- White board.

	Course Coordinator	Head of Department
Name	Dr. Abd El-Aziz Elsayed	Prof .Dr. Hafez Abbas Afify
Name (Arabic)	د.عبدالعزيز السيد	أ.د. حافظ عباس عفيفي
Signature		
Date	/ /2018	/ /2018

Course Specification

Course Title	Theory probability and statistics	
Course Code	CPW 601	
Academic Year	2017-2018	
Coordinator	Prof. Dr / Hafez Abbas Afify	
Teaching Staff	Dr / Sobhy Abdelmenaem Youness	
Branch / Level	Civil Engineering	
Pre-Requisite	-	
Course Delivery	**Lecture**	**2 h lecture**
	Practical	**2 h practical**
Parent Department	Civil Engineering	
Date of Approval		

1. Course Aims

1 – Overall Aims of Course

This course aims the student of getting the best estimated values according to the theory of probability by using the least squares techniques. Any measurement process is subjected to unavoidable variations, however small, that may arise from many different sources such as atmospheric conditions, imperfect instrument calibration and the observer's ability to carry out accurately the different observing operations (e.g. centering, pointing, matching, estimating and reading). At the end of this course the student should has the ability to do the following:

- To understand the difference between: systematic errors and random errors; precision and accuracy; variance and covariance and errors and residuals.
- To understand types and sources of errors in measurements and to draw a probability curve showing standard error and probable error.
- To introduce the difference between the weight, covariance and cofactor matrices.
- To conduct the mathematical models and their linearization for all least square cases.
- To develop basic skills and knowledge for using the least squares process for the general case and the special cases (observation equations and condition equations)
- To conduct the linearization of the functional model of the observation equations (in two and three dimensional coordinates) for slope distance, horizontal and vertical angle observations.

2. Intended Learning outcomes (ILOs)

A. Knowledge and understanding:

By the end of this course students should be able to:

a1- List the principles of the least squares estimation process

a2- Notice the nature of random errors and probability of an error occurring.

a3- Illustrate the different condition of least squares

a4- Define the relationships between the standard error, the precision modulus and measures of precision of a set of measurements.

B. Intellectual skills:

By the end of this course, the students should be able to:

b1-Apply issues of theory of errors for getting the best estimated values of a set of measurements.

b2-Analyze the concepts and applications of surveying information in engineering.

C. Professional and practical skills:

By the end of this course, the students should be able to:

c1-Perform least squares methods for any types of observations like measured lengths of lines and horizontal and vertical angles under different measuring conditions.

c2-Design the accuracy and precision of any measurements in terms of the known means of criteria (standard deviation and mean error) .

D. General and transferable skills:

By the end of this course, the students should be able to:

d1- Manage the reference coordinate systems for GPS in surveying and geodesy.

d2- Use of rigorous engineering approaches tools necessary for quality engineering practices.

d3- Work in team while performing critical analyses in relation to civil engineering.

3. Course Contents

Topic No.	Topic	Total No. of hours	No. of hours	
			Lecture	Tutorial/ Practical
1-2	Direct and indirect observations – Probability theory – Types and sources of errors in measurements – Mistakes – Probability Distributions – Precision and accuracy	16	8	8
3-4	The normal distributions – Sampling distributions – Correlation and regression – Random error of measurements – Most probable value – Residuals – The arithmetic mean – The 50, 90, and 95 percent errors – Standard and probable error.	12	6	6
5-6	Mathematical models and linearization for least squares. Observation equations, condition equations.	12	6	6

7	Least squares estimation process (the general case and the special case). Observation equations. Condation equations.	10	4	6
8	Adjustments of measurements. Adjustment of weighted measurements. Adjustment of a level circuit.	10	6	4

4– Teaching and Learning Methods

4.1- Lectures.
4.2- Problems solution in theoretical exercises.
4.3- Use of computer in geodetic computations and GPS.
4.4-Use of the internet for relevant engineering applications and case studies

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3h	On week 16	60%
Labs and practical Exam	1h	On week 14	20%
Oral Examination	-	-	-
Semester work (Assignments)	5hours (overall)	On week3,5,9	20%

6- List of References

6.1- Essential Books (Text Books)

- Douglas C. Montgomery, 2013, "Applied Statistics and Probability for Engineers," Wiley, Sixth Edition.

6.2- Periodicals, Web Sites, … etc
To be cited during the course

7- Facilities Required for Teaching and Learning

- Portable display screen.
- PC computers

	Course Coordinator	Head of Department
Name	Prof. Dr/ Hafez Abbas Afify	Prof. Dr/ Hafez Abbas Afify
Name (Arabic)	أ.د. حافظ عباس عفيفي	أ.د. حافظ عباس عفيفي
Signature		
Date	/ /2018	/ /2018