CEV319 Computer Applications in Environmental Engineering
Fall 2023

Recep Kaya Göktaş, rkaya.goktas@kocaeli.edu.tr, Room: 2028

Course Schedule:
Fridays, 09:00 - 11:50 (Computer Lab 1044)

Course Homepage: http://rkgoktas.wordpress.com/CEV319

Course Objectives: The objective of this course is to provide an introduction to the use of computer-based applications in environmental engineering. The focus will be on generic tools such as spreadsheets (i.e. Excel) and computational programming (i.e. Python). Also, system dynamics simulations will be introduced using an icon-based application (i.e. InsightMaker). The role of computer-based methods in environmental engineering practice will be discussed.

Course Content: Introduction to the use of computer-based applications in environmental engineering. The use of spreadsheets (tables, functions, graphs). Basic Python (basic features, functions, plotting tools, computational tools). Data analysis with Python. Introduction to system dynamics simulations. Overview of available environmental engineering software tools.

At the end of the course, you will:
- *have an understanding of the contribution of computer applications in solving environmental engineering problems*
- *have the skills to choose the right computer application for the problem at hand.*
- *develop skills for using the proper computer applications as problem solving tools.*

Resources

Books

- Liengme's Guide to Excel 2016 for Scientists and Engineers: Windows and Mac. 2019. Bernard V. Liengme and Keith Hekman. Elsevier.

- "Python Programming and Numerical Methods: A Guide for Engineers and Scientists." (2021). Kong, Q.; Siauw, T.; Bayen, A.M.; Academic Press. (Available through Elsevier: https://www.sciencedirect.com/book/9780128195499/python-programming-and-numerical-methods)

- "Programming for Computations – Python: A Gentle Introduction to Numerical Simulations with Python 3.6, Second Edition" by Svein Linge & Hans Petter Langtangen. Springer. 2020. (Open Access Book: https://www.springer.com/gp/book/9783030168766)

- "A Primer on Scientific Programming with Python, 5th Edition" by Hans Petter Langtangen. Springer. 2016.

Websites

- http://www.engineers-excel.com/index.htm
  Excel examples for engineering applications

- https://realpython.com/
  Various python tutorials

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Grading:

Activity	Weight
Laboratory	14%
Homework	21%
Project	35%
Final Exam	30%
OVERALL	**100%**

Tentative Syllabus

Week	Date	What is going to be covered?
1	6 Oct 2023	Introduction to the Course
2	13 Oct 2023	Introduction to Spreadsheets
3	20 Oct 2023	Python Review
4	27 Oct 2023	Using Functions in Excel
5	3 Nov 2023	Arrays in Excel and Python
6	10 Nov 2023	Conditional Functions in Excel
7	17 Nov 2023	Charts in Excel
8	24 Nov 2023	Data Management and 2D Plots in Python
9	1 Dec 2023	Excel's Goal Seek & Excel's Solver
10	8 Dec 2023	Regression in Excel
11	15 Dec 2023	Polynomials, Curve Fitting & Interpolation in Python
12	22 Dec 2023	Numerical Integration
13	29 Dec 2023	Solving Differential Equations
14	5 Jan 2024	*Project Presentations*

LABORATORY

Your participation in the class/lab applications will be graded. It will contribute to **14%** of your overall grade.

<u>At the start of the semester</u>, every student has **65 points**.

During the semester, you will be able to increase your points. **In-class contributions** (e.g. participating in the solution of example problems and participating in meaningful discussions during the lectures) **may earn you 5 points**.

Any negative contribution (i.e. disturbing peaceful conduct of the lectures) **may lose you 5 points**.

You can check **"Laboratuvar"** in the university's online course system to see your current grade for class participation.

ATTENDANCE REQUIREMENT

You are required to attend **at least 70%** of the classes. I will collect your **signatures** at every class to check if you comply with the attendance requirement.

KOCAELİ ÜNİVERSİTESİ ÖNLİSANS VE LİSANS EĞİTİM-ÖĞRETİM YÖNETMELİĞİ

Devam koşulu

MADDE 17

(1) Öğrenci, ilk kez kayıt yaptırdığı teorik derslerin en az %70'ine, diğer öğretim türlerinin de en az %80'ine devam etmek zorundadır.

(5) Devam koşulu daha önce sağlanmış olan teorik dersin/derslerin tekrarı halinde devam koşulu ile programdaki ders çakışma durumu dikkate alınmaz.

(6) Öğrencilerin derse devamları, sorumlu öğretim elemanı tarafından yoklamalarla imza karşılığı tespit edilir. Devam durumu yarıyıl/yıl sonu akademik takvimde belirtilen derslerin tamamlandığı haftanın son gününe kadar ilgili öğretim elemanı tarafından ÖBS'de ilan edilir.