East West University
Department of Computer Science and Engineering
Course Outline
Fall 2019 Semester

Course Information

Course: CSE225 Numerical Methods (Section: 4)

Teaching Scheme:

	Theory	Laboratory	Total
Credits	3	1	4
Contact Hours	3 Hours/Week for 13 Weeks	2 Hours/Week for 13 Weeks	5 Hours/Week for 13 Weeks

Prerequisite: CSE105 (Structured Programming) and MAT102 (Differential Equations & Special Functions)

Instructor Information

Instructor	**Yeasir Rayhan**
	Lecturer, Department of Computer Science & Engineering,
	East West University, Dhaka, Bangladesh.
Office	Room # AB2 (201)
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Course Site	**https://sites.google.com/site/yeasirrayhan111/cse225**

Class Routine and Office Hour

Day	08:30–10:00	10:10–11:40	11:50–01:20	01:30–03:00	03:10–04:40	4:50-6:50
Sun	CSE 225 AB2 205	Office Hour	CSE 101 529	Office Hour	Office Hour	CSE110 638
Mon	Office Hour	CSE 205 109	Office Hour	CSE110 AB2 502		
Tue	CSE225 638	Office Hour				
Wed	Office Hour	CSE 205 109	Office Hour	CSE110 AB2 502		
Thu	CSE 225 AB2 205	Office Hour	CSE 101 AB2 205			

Course Objective

This course will emphasize the development of numerical algorithms to provide solutions to common problems formulated in science and engineering. The primary objective of the course is

to develop the basic understanding of the construction of numerical algorithms, and perhaps more importantly, the applicability and limits of their appropriate use. Knowledge of this course will be needed as prerequisite knowledge for future course such as CSE365 Artificial Intelligence.

Course Outcomes (COs)

After completion of this course students will have the ability to:

CO1	**Understand** and **use** error estimation and root finding algorithms for solving scientific and engineering problems.
CO2	**Understand** and **use** direct and iterative methods of systems of linear equations for solving scientific and engineering problems.
CO3	**Understand** and **use** numerical techniques of interpolation, differential and integral equations for solving scientific and engineering problems.
CO4	**Interpret** and **apply** numerical techniques; **demonstrate** this knowledge and **write** report for realistic solution of complex scientific and engineering problems.

Course Topics, Teaching-Learning Method, and Assessment Scheme

Course Topic	Teaching-Learning Method	CO	Mark of Cognitive Learning Levels		Mark of COs	Exam (Mark)
			C2	C3		
Numerical methods used for problem solving. Steps in solving a problem with a computer. Mathematical modelling and Error estimation.	Lecture, Class Discussion, Discussion Outside Class with Instructor/ Teaching Assistant	CO1	5		5	**Midterm Exam I (20)**
Root Finding Algorithms (Open and bracketing methods)	Do	CO1		15	15	
Introduction to system of linear equations, Analytical and Iterative methods for linear equations, LU decomposition.	Do	CO2		20	20	**Midterm Exam II (20)**
Curve fitting, Interpolation and Extrapolation.	Do	CO3		6	6	**Final Exam (20)**

					14	14	
Numerical solution of differential and Integral equations.	Do	CO3					

Laboratory Experiments/Project, Teaching-Learning Method, and Assessment Scheme

Experiment	Teaching-Learning Method	CO	Mark of Learning Levels			CO Mark
			C3	P3	A2	
Bisections Method and False Position Method	Preparing Pre-Lab Report, Lab Experiment and Result Analysis, Preparing Post-Lab Report	CO4	3	4	3	10
Newton-Rapson Method	Do	CO4				
Iterative Method	Do	CO4				
Jacobi's method and Gauss –Seidel method	Do	CO4				
Interpolation	Do	CO4				
Numerical Integration	Do	CO4				
Differential Equations solve	Do	CO4				
Lab Exam	Individual Lab Exam	CO4	2	2	1	5
Total			**5**	**6**	**4**	**15**

Mini Project

Mini Project	Teaching-Learning Method	CO	Mark of Cognitive Learning Levels	Mark of Psychomotor Learning Levels	Mark of Affective Learning Levels	CO Mark
			C3	P3	A2	
Mini Lab Project including Report and Presentation	Group-based moderately complex Project with report writing, and oral/poster presentation	CO4	4	3	3	10

Overall Assessment Scheme

		CO			Assessment Area Mark
Assessment Area	CO1	CO2	CO3	CO4	
Class Participation	1.66	1.66	1.66		5
Class Test/Quiz	3.33	3.33	3.33		10
Midterm Exam - I	20				20
Midterm Exam -II		20			20
Final Exam			20		20
Mini Project with report and presentation				10	10
Laboratory Experiments and Exam				15	15
Total Mark	**25**	**25**	**25**	**25**	**100**

Teaching Materials/Equipment

Textbook:

1. S. C. Chapra, R.P. Canale, *Numerical Methods for Engineers*, Seventh Edition, Mc-Graw Hill, 2002.

Reference Materials:

1. J. D. Hoffman, *Numerical Methods for Engineers and Scientists*, Second Edition, Mc-Graw Hill, 1992.

Teaching Materials: Lecture Notes*, Lab Exercises/Notes*, Reference Book, and Computer &Software Python.

Teaching-Learning Method: Lecture Notes*, Lab Exercises*, Assignment.

Lecture and Lab Notes that are required for the course will be delivered during class.

** *Software to compile Python programs:*

IDE	Platform	Console programs
Command Terminal	Linux	Compile console programs using from terminal

Grading System

Marks (%)	Letter Grade	Grade Point	Marks (%)	Letter Grade	Grade Point
97-100	A+	4.00	73-76	C+	2.30
90-96	A	4.00	70-72	C	2.00
87-89	A-	3.70	67-69	C-	1.70
83-86	B+	3.30	63-66	D+	1.30
80-82	B	3.00	60-62	D	1.00
77-79	B-	2.70	Below 60	F	0.00

Exam Dates

Section	Mid Term I	Mid Term II	Final
4	10 October	7 November	12 December

Academic Code of Conduct

Academic Integrity:
Any form of cheating, plagiarism and personification, falsification of a document as well as any other form of dishonest behavior related to obtaining academic gain or the avoidance of evaluative exercises committed by a student is an academic offence under the Academic Code of Conduct and **may lead to severe penalties as decided by the Disciplinary Committee of the university.**

Special Instructions:
- Students are expected to attend all classes and examinations. A student MUST have at least 80% class attendance to sit for the final exam.
- Students will not be allowed to enter into the classroom after 20 minutes of the starting time.
- For plagiarism, the grade will automatically become zero for that exam/assignment.
- Normally there will be **NO make-up exam**. However, in case of **severe illness, death of any family member, any family emergency, or any humanitarian ground**, if a student miss any

exam, the student MUST get approval of makeup exam by written application to the Chairperson through the Course Instructor **within 48 hours** of the exam time. Proper supporting documents in favor of the reason of missing the exam have to be presented with the application.

- For **final exam**, there will be NO makeup exam. However, in case of **severe illness, death of any family member, any family emergency, or any humanitarian ground**, if a student miss the final exam, the student MUST get approval of **Incomplete Grade** by written application to the Chairperson through the Course Instructor **within 48 hours** of the final exam time. Proper supporting documents in favor of the reason of missing the final exam have to be presented with the application. **It is the responsibility of the student to arrange an Incomplete Exam within the deadline mentioned in the Academic Calendar in consultation with the Course Instructor**.
- All mobile phones MUST be turned to silent mode during class and exam period.
- There is **zero tolerance for cheating** in exam. Students caught with cheat sheets in their possession, whether used or not; writing on the palm of hand, back of calculators, chairs or nearby walls; copying from cheat sheets or other cheat sources; copying from other examinee, etc. would be treated as cheating in the exam hall. The only penalty for cheating is **expulsion for several semesters as decided by the Disciplinary Committee of the university**.