

## 1. Course Description

COURSE DESCRIPTION FORM	
Course Code and Title	CHE377 NUMERICAL ANALYSIS METHODS
Course Semester	5
Catalog Description (Content) of the Course	Solutions of linear and nonlinear systems of equations and equations. Numerical methods for interpolation, integration and derivation. Solution of ordinary differential equation systems. Statistical analysis. Data analysis. Regression and correlation.
Main Textbook	Chapra, Steven C., Raymond P. Canale, "Numerical Methods for Engineers", 6th Edition, McGraw Hill, 2010.
Supporting Textbooks	<ul style="list-style-type: none"> <li>Fausett, L.V., "Applied Numerical Analysis Using MATLAB", PrenticeHall, 1999.</li> <li>Mathews, H.J., Fink, D.K., "Numerical Methods Using MATLAB", 4th Edition, PrenticeHall, 2004.</li> <li>Constantinides, Alkis, Navid Mostouf, "Numerical Methods for Chemical Engineers with MATLAB Applications", PrenticeHall, 1999.</li> <li>Cutlip, Michael B., Mordechai Shacham, "Problem Solving in Chemical and Biochemical Engineering with POLYMATH, Excel, and MATLAB", 2th Edition, PrenticeHall, 2008.</li> <li>Rao, Singiresu S., "Applied Numerical Methods for Engineers and Scientists", PrenticeHall, 2002.</li> <li>Montgomery, Douglas C., George C. Runger, "Applied Statistics and Probability for Engineers", 3rd Edition, John Wiley &amp; Sons, 2003.</li> </ul>
Course Credit (ECTS)	5
Prerequisites of the Course (Compulsory attendance should be indicated here.)	There is no prerequisite for this course. There is 70% attendance requirement.
Type of the Course	Compulsory
Instruction Language of the Course	English
Object and Target of the Course	<ul style="list-style-type: none"> <li>Apply the numerical methods to Chemical Engineering problems.</li> <li>Judge under which circumstances a given numerical method is reliable.</li> <li>Writing and using routines with Matlab with numerical algorithms and methods</li> </ul>
Learning Outcomes of the Course	<ol style="list-style-type: none"> <li>1. Ability to apply the knowledge of mathematics, science and engineering.</li> <li>2. To gain the solving skills of engineering problems</li> <li>3. To skill of using the techniques required for engineering applications</li> </ol>
Mode of Delivery	Face to face education
Weekly Schedule of the Course	<p><b>1-2. Week:</b> Finite Difference Methods</p> <p><b>3. Week:</b> Numerical Integration</p> <p><b>4. Week:</b> Numerical Interpolation</p> <p><b>5. Week:</b> Numerical Differentiation</p> <p><b>6-8. Week:</b> Solutions of Linear Systems of Equations</p> <p><b>9-10. Week:</b> Solutions of Nonlinear Equations and Systems of Equations</p> <p><b>11-12. Week:</b> Solutions of Ordinary Differential Equations</p> <p><b>13. Week:</b> Regression and Correlation</p> <p><b>14. Week:</b> Statistical Data Analysis</p>

<b>Educative Activities</b> (Credit will be determined based on the time given for these activities. Should be filled carefully.)	Theoretical Study Hours of Course Per Week Reading Searching in Internet and Library Preparing Homeworks Mid-Term and Studying for Mid-Term Final and Studying for Final									
<b>Assessment Criteria</b>		Quantity	Total Contribution (%)							
	Midterm	2	50							
	Homework	2	5							
	Assignment	2	5							
	Projects									
	Practice		60							
	Quiz		40							
	Contribution of In-term Studies to Overall Grade									
	Contribution of Final Examination to Overall Grade									
	Attendance									
<b>Workload of the Course</b>		Activity	Total Week Count	Weekly Duration (in hour)	Total Workload in Semester					
		Theoretical Study Hours of Course Per Week	14	3	42					
		Practicing Hours of Course Per Week	0	0	0					
		Reading	7	4	28					
		Searching in Internet and Library	7	3	21					
		Designing and Applying Materials	0	0	0					
		Preparing Reports	0	0	0					
		Preparing Presentation	0	0	0					
		Presentation	0	0	0					
		Preparing Homeworks	1	6	6					
		Mid-Term and Studying for Mid-Term	2	4	8					
		Final and Studying for Final	2	6	12					
		Other	0	0	0					
		Total work load			117					
		Total work load/25			4.68					
		ECTS of the course			5					
	<b>Course's Contribution To Program</b>	No	Program Learning Outcomes			1	2	3	4	5
1		Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied information in these areas to model and solve engineering problems.					X			
2		Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and						X		

		modeling methods for this purpose.					
	3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.	X				
	4	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.				X	
	5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.		X			
	6	Ability to work efficiently in intra-disciplinary teams.	X				
	7	Ability to work efficiently in multi-disciplinary teams;	X				
	8	Ability to work individually.			X		
	9	Ability to communicate effectively in Turkish/English, both orally and in writing; Ability to write effective reports and comprehend written reports, make effective presentations,	X				
	10	prepare design and production reports, give and receive clear and intelligible instructions.	X				
	11	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.	X				
	12	Awareness of professional and ethical responsibility.	X				
	13	Information about business life practices such as project management, risk management, and change management.	X				
	14	Information about awareness of entrepreneurship, innovation, and sustainable development.	X				
	15	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety.	X				
	16	Knowledge about awareness of the legal consequences of engineering solutions.	X				
	17	Knowledge on standards used in engineering practice.	X				
<b>Name of Lecturer(s) and Contact Information</b>		1. Prof. Dr. H. Canan CABBAR E-mail: hcabbar@gazi.edu.tr 2. Prof. Dr. Ayla ALTINTEN E-mail: altinten@gazi.edu.tr 3. Prof. Dr. Muzaffer BALBAŞI E-mail: balbasi@gazi.edu.tr 4. Prof. Dr. Kırallı MÜRTEZAOĞLU E-mail: kirali@gazi.edu.tr 5. Prof. Dr. Göksel ÖZKAN E-mail: gozkan@gazi.edu.tr					