



HANYANG UNIVERSITY

Hanyang International Summer School

Faculty Information	Name	Wei WANG					
	E-mail	davidwang@hanyang.ac.kr					
	Home University	Hanyang University (Seoul)					
	Department	Department of Mechanical Engineering					
	Homepage	https://www.soft-robotics.net/					
Course Information	Class No.	18061	Course Code	COE3051	Credits	3	
	Course Name	Engineering Mathematics 1					
	Lecture Schedule	Mon-Thu / 09:00-12:00 AM					
	Course Description	In this course, we learn ordinary differential equation(O.D.E.), linear differential equation(L.D.E.), series, series solution in differential equations and Laplace transformation systematically based on differential and integral calculus (fundamental prerequisite), and the linear algebraic equations by use of matrix analysis.					
	Course Objective	Linear Algebraic Equation, Ordinary Differential Equation(ODE), Linear Differential Equation, Series Solutions of ODEs, Laplace Transforms					
	Prerequisite	None.					
	Materials/Textbooks	Advanced Engineering Mathematics (Erwin Kreyszig)					
Evaluation	Attendance	10 %	Quiz	%			
	Assignment	10 %	Mid-term Exam	40 %			
	Presentation	%	Final Exam	40 %			
	Group Project	%	Participation	%			
	Etc.	Evaluation Item			Ratio		
					%		
Daily Lecture Plan	Week 1	Day 1	Opening Ceremony				
		Day 2	§7.1 ~ §7.3 Linear Systems of Equations. Gauss Elimination				
		Day 3	§7.4 Linear Independence. Rank of a Matrix. Vector Space				
		Day 4	§7.5 ~ §7.7 Determinants. Cramer's Rule §7.8 Inverse of a Matrix. Gauss-Jordan Elimination				
	Week 2	Day 1	§8.1 Eigenvalues & Eigenvectors §1.3 Separable ODEs				
		Day 2	§1.4 Exact ODEs. Integrating Factors §1.5 Linear ODEs. Bernoulli Eqn.				



		Day 3	§2.1 Homogeneous Linear ODEs of 2nd Order
		Day 4	§2.2 Homogeneous Linear ODEs with Constant Coefficients §2.5 Euler-Cauchy Eqns §2.6 Existence & Uniqueness of Solutions. §2.7 Nonhomogeneous ODEs §2.10 Solution by Variation of Parameters Mid-term exam
	Week 3	Day 1	§3.1-§3.2 Homogeneous Linear ODEs §3.3 Nonhomogeneous Linear
		Day 2	ODEs
		Day 3	§5.1 Power Series Method
		Day 4	§5.3 Extended Power Series Method: Frobenius Method Function of the $Y(x)$. General Solutions (Th1 is included only)
	Week 4	Day 1	§6.1 Laplace Transform. First Shifting Theorem(s-Shifting)
		Day 2	§6.2 Transforms of Derivatives and Integrals. ODEs
		Day 3	§6.3 Unit Step unction (Heaviside Function). Second Shifting Theorem(t-Shifting) §6.4 Short Impulses. Dirac's Delta Function. Partial
		Day 4	Functions §6.5 Convolution. Integral Equations §6.6 Differentiation and Integration of Transforms. ODEs with Variable Coefficients Final exam