NEAR EAST UNIVERSITY – COMMON COURSES COORDINATION UNIT

Department of mathematics
Course Information Sheet & Course Outline

Course Code	Course Name	Credit	ECTS
MTH241	Complex Analysis	3	

Pre-requisite: Calculus I and II

Language: English	Course Type: compulsory	Year:2020	Semester: spring

Weekly Hours	Class Hours	Laboratory	Practicum	Learning Sessions			
				PS	C	R	T
	3	0	0				

Learning Outcomes	After the completion of this course, the student will be able to ►Analyse the circuit and engineering phenomena in the aid of complex variables ►Understanding complex numbers and their applications ►Determining usage of complex analysis and integration ►Calculating the several integrals with different methods ►Forecasting the system behaviour in the aid of complex values.
Course Description	This course covers the role of complex analysis for engineering students. The materials have been started with preliminary concepts of complex numbers and variables and will be ended with several techniques of integrals over complex plane.
Course Objectives	The objective of this course is to provide an understanding for the graduate engineering student on complex concepts to include calculating the integration of complex values, introducing the special functions with complex variables, determining the region of Holomorphic functions, Calculating harmonic conjugate,…
Textbooks and/or References	1 Brown, J. W., & Churchill, R. V. (2009). Complex variables and applications. Boston: McGraw-Hill Higher Education,. 2 Conway, J. B. (2012). Functions of one complex variable II (Vol. 159). Springer Science & Business Media. 3 Berenstein, C. A., & Gay, R. (2012). Complex variables: an introduction (Vol. 125). Springer Science & Business Media. 4 5
	The Role of Statistics in Engineering , Descriptive Statistics , Probability , Discrete Random Variables and Probability Distributions ,Continuous Random Variables and Probability Distributions , Joint Probability Distribution, Statistical Interval for a Single sample
Methods and Techniques Used in the Course	Communications and writing method in the class, taking the assignments, offering the related videos and discuss about all contents according to the last developments.
Course Content	1. Complex numbers and operations on the system of complex plane, complex conjugate,… 2. Multiplication and division of complex numbers, different presentation for complex numbers, polar coordinate 3. Region and mapping by complex functions, introducing the image of functions and their properties 4. Euler formula and converting the polar coordinate to Cartesian, roots and their location on the plane,… 5. Limit of two variable functions, the path and limit in the aid of given path,… 6. Derivative of complex valued functions, Cauchy equation, polar forms of Cauchy equation, forms of derivative, 7. Definition of Harmonic functions, Harmonic conjugate, exact differential equation made by conjugate,… 8. Exponential function, Logarithmic functions, Trigonometric functions, Hypergeometric functions and their inverses, complex exponents and branches 9. Contour integral and finding integral over the line and paths, Estimating the value of integral without direct calculations, 10. Integral on simply connected region, Cauchy-Goursat and analytic function's integrals 11. Cauchy integral formula and singularities, finding the integral with higher derivatives, maximum module theorem and finding the maximum of complex variable function,… 12. Series and test of convergences, Taylor expansion of complex variable functions,… 13. Residue theorem and finding integrals in the aid of residues, Laurent series and expansions,…