SYLLABI

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SUBJECT : MAT 51 Complex Function (3 SKS)
GOAL : Students are able to understand the concepts of complex number system, complex functions, elementary transformation, analytical function, and its implementations on various issues that related to the topic.
CONTENT : Complex Number: Complex number system, complex number geometry, and complex number root; Complex Function: Definition of complex function and elementary function. Elementary Transformation: Linear transformation, reverse transformation, and bilinear transformation; Analytical Function: Main concept of topology in complex field, complex function limit, continuity of complex function, derivative complex function, cauchy reimann equation, and analytical function.
TERM : Students has finished Calculus III

All of the concepts stated above are planned to be given to students in 14 weeks. The topics are divided into four sub-topics, which are complex number, complex function, elementary transformation, and analytical function.

All the topics stated on complex function are duplicated pattern of some topic on calculus on complex number set. Therefore on discussing those topics lecturer should reminded the students of the concepts in calculus.

Below are topics that will be discussed on each week.

1st WEEK
TOPIC : Complex Number and Complex Number Geometry
DESCRIPTION : Complex numeric system, complex number conjugation, complex number geometry.

2nd WEEK
TOPIC : Complex Number Geometry and Complex Number Root
DESCRIPTION : Modulus patterns of complex number, and complex number root.

3rd WEEK
TOPIC : Complex Function
DESCRIPTION : Complex function definition, operation on complex function, composite function, Graphical complex function, conjugate complex number, complex number geometry.

4th WEEK

TOPIC : Elementary Function
DESCRIPTION : Linear function, reverse function, bilinear function, exponent function, and logarithmic function.

5th WEEK

TOPIC : Elementary Function
DESCRIPTION : Trigonometry function, and hyperbolic function.

6th WEEK

TOPIC : Elementary Transformation
DESCRIPTION : Linear transformation, and reverse transformation.

7th WEEK

TOPIC : Elementary Transformation
DESCRIPTION : Bilinear transformation, defining linear and bilinear transformation.

8th WEEK

TOPIC : Midterm Test
DESCRIPTION : Test covers topics from complex number to elementary transformation.

9th WEEK

TOPIC : Main Concept of Topology in Complex Number
DESCRIPTION : Definition of neighberhood, open set, closed set, limit point set, complex number interior and exterior.

10th WEEK

TOPIC : Complex Function Limit
DESCRIPTION : Complex function limit definition, and complex function limit patterns.

11th WEEK

TOPIC : Complex Function Limit
DESCRIPTION : Complex function limit patterns (continued)

12th WEEK

TOPIC : Continuity of Complex Function
DESCRIPTION : Function continuity definition; continuity of complex function summary, multiplication, and division, continuity of composite function, continuity of polynomial function and rational function.

13th WEEK

TOPIC : Derivative Complex Function
DESCRIPTION : Definition of derivative complex function, pattern of derivative complex function, and derivative complex function.

14th WEEK

TOPIC : Derivative Complex Function
DESCRIPTION : Cauchy Reimann.Equation

15th WEEK

TOPIC : Analytical Function
DESCRIPTION : Analytical function definition, singular point definition, relation of cauchy reimann theory and analytical function, and harmonic function.

16th WEEK

TOPIC : Final test
DESCRIPTION : Test covers from complex number to analytical function.

REFERENCE:

Churchill, R.V., 1990. *Complex Variables And Applications, Fifth Edition*. New York: Mc. Graw-Hill Publishing Company.

Paliouras, J.D., 1975. *Complex Variables for Scientists and Engineers*. New York: Macmillan Publishing Co. Inc.

Soemantri, R., 1994. *Fungsi Variabel Kompleks.* Depdikbud Dikjen Pendidikan Tinggi Proyek Penulisan dan Peningkatan Mutu Tenaga Kependidikan.