

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN MATHEMATICS
SYLLABUS WITH EFFECT FROM 2020-2021

BMA-CSC15

CORE-XV: COMPLEX ANALYSIS
(Common to B.Sc. Maths with Computer Applications)

Inst.Hrs : 6
Credits : 4

YEAR: III
SEMESTER: VI

Learning outcomes:

Students will acquire knowledge about the basic ideas of analysis of Complex Functions in solving Complex Variables.

UNIT I

Analytic Functions: Functions of a Complex Variable – Limit- Theorems on Limits – Continuous functions- Differentiability – Cauchy – Riemann equations – Analytic functions- Harmonic functions – Conformal mapping.

Chapter 1 – sec 2.1 to 2.9.

UNIT II

Bilinear Transformations: Elementary transformations – Bilinear transformations – Cross ratio- Fixed Points of Bilinear Transformations – Mapping by Elementary Functions - The Mapping $w = z^2$, z^n , n is a positive integer, $w = e^z$, $\sin z$, $\cos z$.

Chapter 3 – sec 3.1 to 3.4 , Chapter 5 – sec 5.1 to 5.5

UNIT III

Complex Integration – definite integral – Cauchy’s Theorem – Cauchy’s integral formula – Higher derivatives. Chapter 6 – sec 6.1 to 6.4

UNIT IV

Series expansions – Taylor’s series – Laurent’s Series – Zeroes of analytic functions- Singularities. Chapter 7 – 7.1 to 7.4

UNIT V

Residues – Cauchy’s Residue Theorem – Evaluation of definite integrals.

Chapter 8 – 8.1 to 8.3.

Content and treatment as in

“Complex Analysis” by Dr.S.Arumugam, Thangapandi Isaac, Dr.A.Somasundaram, SciTech publications(India) Pvt Ltd, 2002.

Reference:

1. Complex variables and Applications (Sixth Edition) by James Ward Brown and Ruel V. Churchill, Mc.Grawhill Inc.
2. Complex Analysis by P.Duraipandian, Kayalak Pachaiyappa, S.Chand & Co Pvt.Ltd.
3. Complex Analysis , T.K.Manickavachagom Pillay, S.Viswanathan Publishers Pvt. Ltd.

e-Resources:

1. <http://ebooks.lpude.in.complexanalysis>.
2. <https://nptel.ac.in>.