Part A: Introduction				
Program: Bachelor in Science (Degree/Honors		Class: B.Sc. Sem. V	Year: 2024	Session:2024-2025
1	Course Code			
2	Course Title	MSE-3		
3	Course Type	Complex Analysis		
4	Course Learning Outcome (CLO)	Discipline Specific Elective (DSE) **This Course will enable the students to:** ➢ Understand Complex number and their properties. ➢ Understand the concept of Limit, Continuity, Differentiability of Complex and Analytic function. ➢ Understand the fundamental Complex integration. ➢ Understand the concept of singularity and meromorphic function.		
5	Credit Value	**Theory & Tutorial: 4**		
6	Total Marks	Maximum Marks : 100 (Ext. 80 + Int. 20)		Minimum Passing Marks:40

Part B: Content of the Course		
Module	**Topics**	**No. of Hours**
I	**Complex Numbers and Their Geometrical Representation:** Complex numbers as ordered pairs, Geometrical representation of complex numbers, Modulus and argument of complex numbers and its Properties, Equation of straight line and circle, Cauchy's inequality and Lagrange's identity..	**15**
II	**Continuity and Differentiability of Complex and Analytic Functions:** Limit, Continuity, Differentiability of functions of a Complex variables, Analytic function, Cauchy – Riemann equations, Conjugate function, Laplace's Differential equations, Harmonic functions, Orthogonal system and Construction of Analytic function.	**15**
III	**Complex integration:** Complex integration, Cauchy-Goursat. Theorem. Cauchy's integral formula. Higher order derivatives. Morera's Theorem. Cauchy's inequality and Liouville's theorem. The fundamental theorem of algebra. Taylor's theorem. Laurent's series.	**15**
IV	**Singularity:** Singularity and its classification. Meromorphic functions. Maximum modulus principle. Schwarz lemma. The argument principle. Rouche's theorem Inverse function theorem.	**15**

Part C - Learning Resource
Text Books, Reference Books, Other Resources
1. Complex Analysis By L.V.Ahlfors, McGraw - Hill, 1979.
2. J.B. Conway, Functions of one Complex variable, Springer-Verlag, International student- Edition, Narosa Publishing House, 1980.
3. H.K. Pathak, Complex Analysis and Applications, ShikshaSahityaPrakashan , 2019
4.H.A. Priestly, Introduction to Complex Analysis, Clarendon Press, Oxford 1990.
5. Complex Function Theory By D.Sarason

6. Liang-shin Hahn & Bernard Epstein, Classical Complex Analysis, Jones and Bartlett Publishers International, London, 1996.
7. S. Lang, Complex Analysis, Addison Wesley, 1977.
8. D. Sarason, Complex Function Theory, Hindustan Book Agency, Delhi, 1994.
9. Mark J.Ablowitz and A.S. Fokas, Complex Variables: Introduction and Applications, Cambridge University press, South Asian Edition, 1998.
10. C.Caratheodory, Theory of Functions (2 Vols.) Chelsea Publishing Company, 1964.
11. E.C Titchmarsh, The Theory of Functions, Oxford University Press, London.
12. S.Ponnusamy, Foundations of Complex Analysis, Narosa Publishing House, 1997.

E-Recourses:

https://onlinecourses.nptel.ac.in
https://epgp.inflibnet.aci.in
https://swayam.gov.in
https://www.mooc.org

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: **100 Marks**
Continuous Comprehensive Evaluation (CCE): **20 Marks**
Semester End Exam (SEE): **80 Marks**

Internal Assessment: Continuous Comprehensive Evaluation(CCE)	Internal Test -02 of 10 Marks each Assignment/Seminar-01 0f 10 Marks	Better marks out of two test + obtained marks in Assignment shall be considered against 20 marks
Semester End Exam (SEE)	Paper-**Two Section**-A&B Section-A: Objective and short answer type question-1x10+3x10= 40 Marks Section-B: Descriptive answer type question Module wise- 10x4 =40 Marks	
Amendment or Modification shall may be made by course coordinator as per situation or directed by the department/Examination cell/NEP-20 Scheme coordinator		

Name and signature of convener & member of BOS: