| Code | Subject Title | Cr. Hrs | Semester |
|------|---------------|---------|----------|
| MATH-309 | Complex Analysis – II | 3 | VI |
| Year | Discipline | | |
| 3 | Mathematics-I,II | | |

**Singularity and Poles**
- Review of Laurent series
- Zeros, singularities
- Poles and residues

**Contour Integration**
- Cauchy's residue theorem
- Applications of Cauchy's residue theorem

**Expansion of Functions and Analytic Continuation**
- Mittag-Leffler theorem
- Weierstrass's factorization theorem
- Analytic continuation

**Elliptic Functions**
- Periodic functions
- Elliptic functions and its properties
- Weierstrass function $\varphi(z)$
- Differential equation satisfied by $\varphi(z)$
- Integral formula for $\varphi(z)$
- Addition theorem for $\varphi(z)$
- Duplication formula for $\varphi(z)$
- Elliptic functions in terms of Weierstrass function with the same periods
- Quasi periodic functions: The zeta and sigma functions of Weierstrass
- Jacobian elliptic functions and its properties

*Recommended Books*
1. H. S. Kasana, *Complex Variables*: *Theory and Applications*, (Prentice Hall, 2005)
2. M. R. Spiegel, *Complex Variables*, (McGraw Hill Book Company, 1974)
3. Louis L. Pennisi, *Elements of Complex Variables*, (Holt, Linehart and Winston, 1976)
4. W. Kaplan, *Introduction to Analytic Functions*, (Addison-Wesley, 1966)
5. E. D. Rainville, *Special Functions*, (The Macmillan Company, New York, 1965)
6. E. T. Whittaker and G. N. Watson, *A Course of Modern Analysis*, (Cambridge University Press, 1958)