**Module Syllabus:**

Course Title: Complex Analysis
Course Code: 250312
Semester: Second / 2017–2018
Lecturer : Amin Witno
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**Short Description:**

This module is an introduction to complex variables, covering basic topics in the algebraic and geometric aspects of complex numbers, analytic functions, continuity and differentiability, line integrals, properties of entire functions, simply connected domains, isolated singularity, and the residue theorem.

**Week-by-Week Plan:**

| Week | Topics of Study |
|---|---|
| **1** | Complex numbers: general properties, the geometry of complex planes, the point at infinity. |
| **2** | Sequences and series, the Cauchy sequence, functions of a complex variable, complex polynomials. |
| **3** | Analytic functions and the Cauchy-Riemann equations. |
| **4** | The exponential function, sin z and cos z, properties of the line integrals. |
| **5** | Entire functions, the closed curve theorem, the integral theorem. |
| **6** | The Cauchy integral formula, Taylor expansions. |
| **7** | Liouville theorems and the fundamental theorem of algebra. |
| **8** | Power series representation for analytic functions, uniqueness theorem, maximum-modulus theorem. |
| **9** | The open mapping theorem, Schwarz lemma, Morera's theorem. |
| **10** | Simply connected domains, the general closed curve theorem, the function log z. |
| **11** | Isolated singularities and removable singularities. |
| **12** | Residue theorem and winding numbers. |
| **13** | Meromorphic functions, the generalized Cauchy integral formula. |
| **14** | Contour integral technique for evaluating definite integrals. |
| **15** | Contour integral technique for evaluating infinite series. |

**Textbooks:**

The following textbooks are recommended.

- Brown and Churchill, Complex Variables and Applications, 9th Edition 2013
- Bak and Newman, Complex Analysis, 3rd Edition 2010
- Spiegel, et.al., Complex Variables, Schaum's Outline, 2nd Edition 2009

**Online Resources:**

The shortcut to my web homepage at the University is http://phi.witno.com

**Mark Distribution:**

- Homework, Attendance, and Quizzes 20%
- First Exam 20%
- Second Exam 20%
- Final Exam 40%

Exam dates, once determined, will be posted online at the above homepage.

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