THE CHINESE UNIVERSITY OF HONG KONG

Department of Mathematics

MATH2230A (First term, 2015–2016)

Complex Variables and Applications

Course Description

The Course

This course covers the calculations involving complex numbers and complex analytic functions. Some theories are also discussed, but there is not enough time to focus on sophisticated ones. Nevertheless, their use in other branches of mathematics or sciences will be needed.

Students are expected to have strong ability in calculus, advanced calculus, and matrices. Quick response is expected whenever knowledge in those subjects are involved. Basic understanding of one variable analysis, including limits, sequences, convergence, and continuity is needed. Some knowledge of metric space or topology of the plane will be helpful.

This course will mainly follow the textbook; with skipping some of the details or topics at times. Students are encouraged to fill up the gaps by themselves. Lectures will proceed in fast pace because they only provide a guide for you. They should never NEVER be seen as defining the WHOLE course content. Students should also read the textbook and do the exercises.

Teachers

Lectures	Thomas Au	LSB 213	thomasau@cuhk.edu.hk	3943 7981
Tutorials	To be announced			

Course Information

Besides general information given out by the university and registration section, particular ones about this course will usually be announced in lectures, course webpage, or sent to your CWEM account only. Please set up your own email forwarding, if you wish so, and keep your account active.

Textbook and References

`Basic Text`

R. V. Churchill and J. W. Brown. *Complex Variables and Applications.* 8th edition. McGraw Hill.

`References of similar level but different coverage`

A. Beardon. *Complex Analysis: the argument principle in analysis and topology.* Wiley.

T. Needham. *Visual Complex Analysis.* Oxford University Press.

`References of different level`

L. V. Ahlfors. *Complex Analysis.* McGraw Hill.

E. M. Stein and R. Shakarchi. *Complex Analysis.* Princeton University Press.

E. B. Saff and A. D. Snider. *Fundamentals of Complex Analysis for Mathematics, Science, and Engineering.* Prentice Hall.

A. D. Wunsch. *Complex Variables with Applications.* Addison Wesley.

A. D. Osborne. *Complex Variables with their Applications.* Addison Wesley.

`Course web url` http://www.math.cuhk.edu.hk/course/math3253/.

Assessment

The final course grade is determined by the following factors: tutorial participation ($P \leq 10\%$), two tests ($T \leq 2 \times 20\%$), and an examination ($E \leq 50\%$).

Tutorial participation will be counted starting from Sept 15 (Tue) until Dec 2 (Wed) for a total of 11 tutorials. Each tutorial will have 1 credit towards P and the maximum for the course is 10. In the tutorial, students are required to practice, discuss, and hand-in ***classwork.*** Missing or unsatisfactory classwork will have no credit in P. No additional homework will be required to submit. On the other hand, students who have performed well in tests will be granted "tutorial credits", which may compensate for tutorial absence. Mathematically, $P = \min\{10, \quad (\text{good participation}) + (\text{credits})\}$.

Each test is scheduled during a Thursday lecture, 08:30am–10:15am. The test location will be announced later. Questions in the tests include normally standard questions and questions which may require more thinking and skills.

The absence of a test will result in a zero score, unless in the case of sickness (with written proof by a physician) or other serious incidents (with the approval of the Department). In such cases, the assessment method will be determined according to the situation. Absence of examination for any reason must go through the Examination Section of the University.

Schedule

A tentative schedule is given below for your reference. Changes will be announced in the lecture.

Test 1	Oct 15 (Thu)	**08:30–10:15**	To be announced
Test 2	Nov 12 (Thu)	**08:30–10:15**	To be announced
Examination		centrally administered	

Week 1–3	Complex numbers and functions, analytic functions
Week 4–7	Elementary functions, Contour Integrals, Cauchy Theorem
Week 8–10	Cauchy Integral Formulas, Important Theorems, Series
Week 11–13	Residues and poles, Real integrals by residues, Argument Principle