

University of Moratuwa, Faculty of Engineering, Department of Mathematics-20190116
 BSc Engineering Honors Degree-17S3(712)
 2019/01/14-2019/05/03-14 weeks, Holidays-2019/04/05-2019/04/22
 CE(129)+CH(80)+MT(52)+TT(58)-Tue 10.15: 12.15-NA1(319)
 BM(15)+EN(101)+ME(129)-Tue 13.15: 15.15-NA2(245)
 EE(101)+ER(47)-Fri 10.15: 12.15-AUD1(148)

Lecturer: Dr. Udaya Chinthaka Jayatilake

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Module Code	MA2023	Title	Calculus			
Credits	02	Hours/ Week	Lectures	02	Pre-requisites	MA1023
			Lab/Tutorials	-		

Learning Outcomes: At the end of this module the student should be able to

- Perform vector differentiation and integration and evaluate vector and scalar quantities in various engineering applications.
- Apply Divergence, Stokes' and Green's theorem in various situations.
- Apply Cauchy's integral formula to solve engineering problems.
- Perform contour integration techniques.
- Apply conformal mapping in physical system modeling.

Outline Syllabus

Vector Calculus

- Double integral, triple integral, vector functions;
- Introduction to vector calculus. Vector differentiation and differential operators.
- Space curves and line integral, surface integrals;
- Divergence theorem, Stokes' theorem and Green's theorem in a plane.
- Some basic applications.

Complex Variables

- Analytical function and Cauchy-Reimann equation.
- Cauchy's integral formula and applications.
- Taylor and Laurent's series.
- Contour integration.
- Introduction to conformal mapping.

Method of Assessment

End of semester examination: 2 hour closes book paper: 70%

Mid semester examination: 1 hour open book paper: 10%: **Monday 2019/03/18-18.30-19.30**

In-class assessments: 12%

Take-home assessment: 8%

References

- Advanced Calculus, David V. Widder
- Multivariate Calculus and Geometry, Sean Dineen
- Calculus: Volume I & II, Tom M. Apostol
- Mathematical Analysis, Tom M. Apostol
- Advanced Engineering Mathematics, Michael D. Greenberg
- Complex Variables: Introduction and Applications- Cambridge Texts in Applied Mathematics, Mark J. Ablowitz and Athanassios S. Fokas .
- <http://www.wolframalpha.com/>
- <http://mathworld.wolfram.com/>
- Gravity- an Introduction to Einstein's General Relativity, James B. Hartle
- Introduction to Continuum Mechanics, Morton E. Gurtin