Ahsanullah University of Science and Technology Bangladesh (AUST)

COURSE OUTLINE

1. Title: Mathematics III

2. Code: MATH 2101

3. Credit hours: 3.0

4. Level: 2nd Year, 1st Semester

5. Faculty: Engineering

6. Department: Arts and Sciences

7. Programme: B.Sc. in Computer Science and Engineering

8. Synopsis from the Approved Curriculum:

Complex Variable:
Complex Number system; General function of Complex variables, Limits and continuity of a function of complex variable, Complex differentiation and the Cauchy–Riemann equation, Mapping and conformal mapping of elementary functions, Cauchy's Integral theorem, Cauchy's Integral formula; Taylor's and Laurent's theorem; Singular points, Residues and evaluation of residues, Cauchy's Residues theorem, Contour integration.

Laplace Transform:
Definition, Laplace transform of some elementary functions, Inverse Laplace transformations, The unit step function, Periodic function, Evaluation of improper integrals. Solution of some differential equations and integral equations by Laplace transform.

Statistics:
Frequency distribution, Mean, Median, Mode and other measures of central tendency, Standard deviation and other measures of dispersion, Moments, Skewness and kurtosis, Elementary probability theory and discrete probability distribution e.g. Uniform, Bernoulli, Binomial; Continuous probability distribution e.g. Uniform, Normal and Poisson; Hypothesis testing and Regression analysis.

9. Type of course (core/elective): Core.

10. Prerequisite(s) (if any): N/A

15. Week wise distribution of contents and assessment methods

Week	Topics	Assessment Method(s)
1	Introduction, Discussion about course outline and objectives.	
	Complex Variable	
2-3	Complex number system.	
3-4	General functions of a complex variable, Limits and continuity of a function of complex variable.	
4-5	Complex differentiation and the Cauchy-Riemann equation. Mapping and Conformal mapping of elementary functions.	
		Class Test # 01
5-7	Cauchy's integral theorem, Cauchy's integral formula.	
7-8	Taylor's and Laurent's theorem.	
8-9	Singular points. Residue and evaluation of residues, Cauchy's residue theorem. Contour integration.	
10		**Class Test # 02**
	Laplace Transform	
10-11	Definition, Laplace transform of some elementary function,	
11-12	Inverse Laplace transformations, the unit step function, periodic function,	
12-13	Evaluation of improper integrals, Solution of some differential equations and integral equations by Laplace transform and review class.	
14		**Class Test # 03**

Part B (1 class per week)

Week	Topics	Assessment Method(s)
1 - 3	Introduction and Basics of statistics, Data management (frequency distribution)	
3 - 5	Measures of Central Tendency, Measures of Dispersion	
6		**Class Test # 01**
7 - 9	Continuation of Measures of Dispersion, Correlation, Regression, Moments, Skewness, Kurtosis	

11. Name of the instructor(s) with contact details and office hours:

Neerob Basak (For part A) Room No: 5A01-08 Lecturer, AUST, Phone: 01974369020 Email: neerobbasakmth@gmail.com **Consulting hour:** Monday: 1.00pm-3.00pm Tuesday: 8.30am-10.30am. Wednesday: 9.40 am-11.20 am.	Ifte Khyrul Amin Abbas (For part B) Room No: 5A01-08 Assistant Professor, AUST. Phone: 01818252501 E-mail: parag25parag@yahoo.com parag25parag@gmail.com **Consulting hour:** Monday: 11:30 am – 02:30 pm Tuesday: 01: 00 pm – 03:00 pm Wednesday: 10:30 am – 12:00 pm

12. Semester Offered: Fall, 2018

13. Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Bloom's Taxonomy Level

Sl. No.	Cos By the end of the course, students will be expected to:	POs	Bloom's Taxonomy C	A	P
1	**Illustrate** the concept of complex number system, complex functions, limit, continuity, differentiability, analyticity of complex valued function.	1	3		
2	**Apply** the general theorems and integrals of complex function for solving various.	1	3		
3	**Illustrate** basic concept of Laplace transform for finding Laplace transform of different types of functions.	1	3		
4	**Apply** Laplace transform for solving problems in engineering sciences.	1	3		
5	**Determine** the relationship between variables for prediction purpose using statistical methods, such as correlation and regression analysis.	1	3		
6	**Compare** between effective and less effective equipments and systems through statistical methods.	1	2		
7	**Explain** probability concepts and their uses in different problems regarding engineering fields.	1	2		
8	**Apply** statistical techniques in testing the significance of the outcomes from engineering data analysis.	1	3		

14. Percentages of Assessment Methods

Method	Percentage
Attendance & Class Performance	10
Quizzes	20
Final Examination	70

10 - 12	Probability and Probability distribution (Bernoulli, Binomial, Poisson, Normal etc.), Sampling techniques.	
13	Hypothesis testing and course revision	
14		
		Class Test # 02

16. References:

16.1 Required books: For Complex variable and Laplace Transform
i) Advanced Engineering Mathematics by *H. K. Das*
ii) Complex Variables, *Schaum's Outline Series*

Required books: For Statistics
i) Probability and Statistics for Engineers and Scientists, *Ronald E. Walpole, Sharon L. Myers, Keying Ye*

16.2 Recommended books: For Complex variable and Laplace Transform
i) Complex Analysis by Prof. Dr. M.F. Rahman

Recommended books: For Statistics
i) Probability and Statistics for Engineers and Scientists, *Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers.*
ii) Introduction to Probability and Statistics for Engineers and Scientists, *Sheldon M. Ross*
iv) Business Statistics. *S.P. Gupta, M.P. Gupta*

Prepared by:	Checked by:	Approved by:
Signature: _____ Name: Neerob Basak Department: Arts and science Date: Signature: _____ Name: Ifte Khyrul Amin Abbas Department : Arts and Sciences Date:	Signature: _____ Name: Dr. Muhammad Saiful Islam Mallik, and Dr. Mohammad Abdul Kader OBE Program Coordinators, Department: Arts and Sciences Date:	Signature: _____ Name: Dr. Tamanna Afroze Head, Department: Arts and Sciences Date: