COURSE OUTLINE

1	**Faculty**	Faculty of Science and Engineering (FSE)
2	**Department**	Computer Science and Engineering
3	**Programme**	B.Sc. in Computer Science and Engineering
4	**Name of Course**	Statistics and Complex Variables
5	**Course Code**	MAT 201
6	**Trimester**	Fall 2021
7	**Pre-requisites**	MAT 101
8	**Status**	Basic Science Course
9	**Credit Hours**	3
10	**Section (s)**	203 DA&203 DB

11	**Class Hours**				

Section	Class Day	Class Hours	Venue
203 DA	Monday	4:30 PM-6:00 PM	Online
	Wednesday	4:30 PM-6:00 PM	Online
203 DB	Monday	3:00 PM-4:30 PM	Online
	Wednesday	3:00 PM-4:30 PM	Online

12	**Class Location**	Online
13	**Course website**	https://classroom.google.com/c/MzQ2MDQyNzIzOTI4?cjc=4fvl4qy(203DA) https://classroom.google.com/c/NDA2Nzk5NjkzMjQ1?cjc=joha7t7(203 DB)
14	**Instructor**	Ms.Tanzila Yeasmin Nilu (203 DA, 203 DB),
15	**Contact**	tanzila@cse.green.edu.bd (203DA, 203DB),
16	**Office**	NA (due to online classes)

17	**Counselling Hours**			

Section	Day	Counseling Hours	Venue
203DA	Monday	10:00 AM-11:30 AM	Online
203DB	Tuesday	03:00 PM-04:30 PM	Online

18	**Textbook**	1. Walpole and Myers. Probability and Statistics for Engineers & Scientists. 9th Edition.

		2. Larson, R. and Farber, B. (2014), "Elementary Statistics Picturing the World", 6th edition. 3. James Ward Brown and Ruel V. Churchill. Complex Variables and Applications.7th Edition.
19	**Reference books**	1. "Fundamentals of Mathematical Statistics" by S.C Gupta & V.K Kapoor 2. "An Introduction to Statistics and Probability" by Nurul Islam
20	**Equipment & Aids**	Bring your own materials *(calculator, pen, paper, etc.)* to participate effectively in classroom activities. **You are not allowed to borrow from others inside the classroom during class activities.** *Note: Besides class note, please keep at least one blank A4 size paper per class with you.*
21	**Course Rationale**	This course will introduce you to fundamental statistical concepts and modern statistical practice. You will study statistical data investigations, summary statistics, data visualization and probability as a measure for uncertainty. You will then build upon these topics and learn about sampling, sampling distribution and confidence intervals as the basis of statistical inference. Also, the course will give you the idea about complex variables, complex numbers, analytic functions, Cauchy integral theorem etc.
22	**Course Description**	**Statistics:** Types and sources of data; Uses and limitations of statistics; Presentation of data and exploratory data analysis tools; Histograms; Characteristics of data; Measures of location - mean, median and mode; Range, Standard deviation and other measures of dispersion; Moments; Skewness and kurtosis; Correlation and regression analysis; Experiments; Events; Set theory; Axioms of probability and counting methods for computing probability; Conditional probability; Discrete and continuous probability distribution; Mathematical expectation; Population and sample variance; Binomial distribution; Normal distribution; Cauchy distribution. **Complex Variable**: Complex number system; General functions of a complex variable; Curve sketching; Limits and continuity of a function of complex variable and related theorems; Complex differentiation; Cauchy Riemann equations; Cauchy's integral formula; Taylor's Theorem and Laurent's Theorem; Singular points; Contour integration.
23	**Course Outcomes (CO)**	After completing this course students will be able to **CO1**: Describe basic concepts of complex number systems, statistics and probability. **CO2**: Solve the various problems in complex fields, some statistical method and probability distributions. **CO3:** Choose the proper technique for the problems of statistics and complex variables.
24	**Teaching Methods**	Maximum topics will be covered from the textbook. For the rest of the topics, reference books will be followed. Some class notes will be uploaded on the web. White board will be used for most of the time. For some cases, multimedia projector will be used for the convenience of the students. Students must participate in classroom discussions for case studies, problems solving and project developments.
25	**Topic Outline** All topics and problems are from the main text if not specified otherwise.	

Lecture	Selected Topics	Article	Suggested Problems. (Text)
(1-2)	Types and sources of data, Presentation of data and exploratory data analysis tool, uses and limitations of statistics	1.1, 1.2 (Text-1) 1.3, 1.4 (Ref-1)	1,2,3
	Frequency distribution, relative frequency, cumulative frequency, Graphical representation of frequency distribution: Histogram	2.1, 2.2 (Text-2)	1, 2, 3,4, 5, 6 Exercises- 15, 16, 29, 30, 31-34, 41, 42 (2.1) 1, 2, 4, 5 (2.2)
(3-7)	Measures of central tendency: Arithmetic mean, median, and mode	2.3 (Text-2)	
	Measures of Variation: Range, Variance, Standard Deviation, Coefficient of variance	2.4 (Text-2)	1, 2, 3, 8, 9, 10, Exercises- 13, 14,15, 16, 43-48
	Measures of Position: Quartiles, Deciles, Percentiles	2.5 (Text-2)	
	Forms of distribution: Moments, Skewness and Kurtosis	3.9, 3.13, 3.14 (Ref-1) (Ref-1)	3.8, 3.9, 3.10, 3.11, Exercises- 5(a, b), 6(b
(8-12)	Theory of Probability: Sample, Sample Space, Events	2.1, 2.2, 2.3, 2.4 (Text-1)	1, 2, 3,4,6, 8,9,12, 13,15, 17, 20, 21, 22, 24, 26, 27, 28
	Conditional probability and Baye's theorem	2.5, 2.6, 2.7 (Text-1)	30, 31, 32, 33, 34, 35, 36, 37, 38, 41, 42
	Random Variable, Discrete Probability distributions, Continuous Probability distributions, Joint Probability distribution	3. 1, 3.2, 3.3, 3.4 (Text-1)	1, 2, 3, 8, 9, 11, 12, 15, 17, 18, 19, 20
	Mathematical Expectation and Variance of a random variable	4.1, 4.2 (Text-1)	1, 2, 3, 5, 7, 8, 9, 10, 11, 12, 13, 14
(13-16)	Binomial Distribution	5.2, 5.4, 5.5 (Text-1)	1, 2, 4, 5, 6, 14, 15, 17, 18, 19, 20
	Normal Distribution	6.1, 6.2, 6.3, 6.4 (Text-1)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12,13
(17-19)	Complex number system, Curve Sketching	1.1-1.10, 2.11 (Text-3)	1, 2, 3, Exercise 2, 3
	General functions of complex variable	2.12, 2.13 (Text-3)	3, 4(a, b, c), 5(a, b)

		Limits and continuity of a function of a complex variable	2.14, 2.15, 2.17 (Text-3)	1, 2 Exercise-1,2, 4,5
		Complex differentiation	2.18, 2.19 (Text-3)	1(a, b, c, d), 2, 3
	(10-21)	Cauchy Riemann equations	2.20, 2.21 (Text-3)	1, 2 (2.20), 1, 2(2.21)
		Analytic function and It's application	2.23, 2.24 (Text-3)	1, 2, Exercise 1(a, b, c, d), 4
	(22-24)	Cauchy integral formula	2.25, 4.47 (Text-3)	1, 2, 3, Exercise-1(a, b, c, d), 6, 7
		Contour integration	4.38, 4.39 (Text-3)	1,2,3,4,5
		Taylor's Theorem and Laurent's Theorem	5.53, 5.55 (Text-3)	1, 2, 3, 4, 5 (5.53) 1, 2, 3 Exercise-1,2,3,4,5(a, b), 6,7

26	**Assessment and Marks Distribution:**	Students will be assessed on the basis of their overall performance in all the exams, quizzes, and class participation. Final numeric reward will be the compilation of (tentative):
		❖ Class Test (15%)
		❖ Project (5%)
		❖ Project Presentation (5%)
		❖ Class Attendance (5%)
		❖ Mid-Term Exam (30%)
		❖ Final Exam (40%)

27	**Assessment Methods of COs**	Assessment methods of COs are given below:

	Course Outcomes		
Assessment Methods	**CO1**	**CO2**	**CO3**
Class Test	15%		
Group Assignment, Individual Presentation, Attendance		5%	10%
Mid-Term Exam	25%	5%	
Final Exam	30%	10%	
Total (100%)	**70%**	**20%**	**10%**

28	**Mapping of COs with POs**	Mapping of COs with program outcomes (POs) are given below:

Program Outcomes (POs)											
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	√											
CO2		√										
CO3					√							

| 29 | **Grading Policy** | The following chart will be followed for grading. This has been customized from the guideline provided by the School of Engineering and Computer Science. |

A+	A	A-	B+	B	B-	C+	C	D	F
80 and above	75-<80	70-<75	65-<70	60-<65	55-<60	50-<55	45-<50	40-<45	<40

30	**Additional Course Policies**		
		Assignments	One group assignment will be given to the student where the students may have to explore new topics related to structured programming. ***Note: Any kind of copy in assignment will carry zero mark.***
		Class Test	There will be at least three CTs, best of two will be counted. A CT can be taken with an announcement in prior or without any announcement.
		Exams	Mid-term and final exam will be closed book, closed notes. Mobile is strictly prohibited in exam hall. Please bring your own watch and synchronize time during exam hours.
		Test Policy	If you are absent from a test, and you have not spoken to the teacher personally beforehand, your grade for the test will be zero. No make-up for class test will be taken because it has alternative (three out of four). No make-up for mid will be entertained without presence and recommendation of guardian and written permission of the department. Make-up test of mid will be much harder than the regular test.

| 31 | **Additional Information** | a. Academic Calendar Fall 2021: http://www.green.edu.bd/academics/academic-calendar.
b. Academic Information and Policies: http://www.green.edu.bd/academics/academic-rules-a-regulations.
c. Grading and Performance Evaluation: http://www.green.edu.bd/academics/academic-rules-a-regulations.
d. Proctorial Rules: http://www.green.edu.bd/administrator/proctors-office. |