

## COURSE DESCRIPTION FORM

**INSTITUTION** Department of Computer Science  
National University of Computer and Emerging Sciences, Karachi

**PROGRAM (S) TO BE** BS Computer Science

**EVALUATED**

### A. Course Description

<b>Course Code</b>	CS211								
<b>Course Title</b>	Discrete Structures (Fall 2020)								
<b>Credit Hours</b>	3								
<b>Prerequisites by Course(s) and Topics</b>	None, self-contained								
<b>Assessment Instruments with Weights</b> (homework, quizzes, midterms, final, programming assignments, lab work, etc.)	<table> <tr> <td>Midterm examinations I and II</td><td>30%</td></tr> <tr> <td>End-term examination</td><td>50%</td></tr> <tr> <td>Quizzes (3 minimum)</td><td>10%</td></tr> <tr> <td>Assignments (3 minimum)</td><td>10%</td></tr> </table>	Midterm examinations I and II	30%	End-term examination	50%	Quizzes (3 minimum)	10%	Assignments (3 minimum)	10%
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<b>Course Coordinator</b>	Dr. Fahad Samad ( <a href="mailto:fahad.samad@nu.edu.pk">fahad.samad@nu.edu.pk</a> )								
<b>URL (if any)</b> <b>SLATE &amp; GOOGLE CLASSROOM</b>	<a href="http://www.slate.nu.edu.pk/portal/site/KHICS211FALL2020CS">http://www.slate.nu.edu.pk/portal/site/KHICS211FALL2020CS</a> <a href="https://classroom.google.com/u/0/c/MTUxNjY2MTI4Nzg4">https://classroom.google.com/u/0/c/MTUxNjY2MTI4Nzg4</a> (Sec-A) <a href="https://classroom.google.com/u/0/c/MTUyNzA2NDA0MDIw">https://classroom.google.com/u/0/c/MTUyNzA2NDA0MDIw</a> (Sec-G)								
<b>Current Catalog Description</b>	Logic, relations, functions, basic set theory, counting, proof techniques, mathematical induction, graph theory, discrete probability, recursion, recurrence relations, and number theory. All the topics will be taught in perspective of their applications in computing.								
<b>Textbook (or Laboratory Manual for Laboratory Courses)</b>	Kenneth H. Rosen, Discrete Mathematics and Its Applications, 8th Edition, McGraw Hill, 2019.								
<b>Reference Material</b>	Sussana S. Epp, Discrete Mathematics with Applications, Brooks Cole, Cengage Learning, 5th Edition, 2020.								
<b>Course Goals</b>	A discrete mathematics course has more than one purpose. Students should learn a particular set of mathematical facts and how to apply them; more importantly, such a course should teach students how to think logically and mathematically. To achieve these goals, the focus of this course is on basic mathematical concepts in discrete mathematics and on applications of discrete mathematics in								

	<p>algorithms and data structures. The focus is also on teaching the problem-solving strategies, techniques, and tools and to show students how discrete mathematics can be used in modern computer science. In particular, this course is meant to introduce logic, proofs, sets, relations, functions, counting, and probability, with an emphasis on applications in Computer Science. Further, this course aims to develop understanding and appreciation of the finite nature inherent in most Computer Science problems and structures through study of combinatorial reasoning, abstract algebra, iterative procedures, predicate calculus, tree and graph structures.</p>			
<p><b>Topics Covered in the Course, with Number of Lectures on Each Topic</b> (assume 15-week instruction and one-hour lectures)</p>	<ul style="list-style-type: none"> <li>Introduction: Discrete Structures and its applications, Propositional Logic, Applications of Propositional Logic, Propositional Equivalences <b>(3 hours)</b></li> <li>Predicates and Quantifiers, Nested Quantifiers <b>(3 hours)</b></li> <li>Rules of Inference <b>(3 hours)</b></li> <li>Sets and Functions <b>(6 hours)</b></li> <li>Relations <b>(6 hours)</b></li> <li>Number Theory and Cryptography <b>(6 hours)</b></li> <li>Graph theory, graph-theoretic algorithms <b>(6 hours)</b></li> <li>Trees and their applications <b>(3 hours)</b></li> <li>Mathematical Proofs, Mathematical Induction <b>(3 hours)</b></li> <li>Combinatorics: Permutation, Combination, Inclusion-Exclusion Principle <b>(6 hours)</b></li> <li>Discrete Probability (introduction) <b>(2 hours)</b></li> </ul>			
<p><b>Laboratory Projects/Experiments Done in the Course</b></p>	None			
<p><b>Programming Assignments Done in the Course</b></p>	Possibly one or two questions in the assignments to make sure that the students understand how to implement the concepts in programming.			
<p><b>Class Time Spent on</b> (in credit hours)</p>	<b>Theory</b>	<b>Problem Analysis</b>	<b>Solution Design</b>	<b>Social and Ethical Issues</b>
	1	1	1	0
<p><b>Oral and Written Communications</b></p>	N/A			

**Instructor Name** Fahad Samad

**Instructor Signature** \_\_\_\_\_

**Date** 26-08-2020