BSE1104; Discrete Mathematics (3CU)

Course Objectives. Upon successful completion of this course, the student will: (i) Be familiar with the terminology, operations, and symbols offset theory, and with formal logic. (ii)Be able to uselogictodeterminethevalidityofanargument.(iii)Beabletoconstructtheproofofatheorem directly,bythecontrapositive,bycases,bycontradiction,bytruthtable,bycounter-example,andby mathematicalinduction.(iv)Beabletoidentifyarelation;specifically,apartialorder,equivalence relation, or total order. (v) Be able to identify a function; specifically, subjective ,injective ,and objective functions.(vi) Be able to perform operations on matrices.(vii) Be familiar with the terminology for graphs and trees.(viii)Be able to trace Euler and Hamiltonian paths.(ix)Be able to construct minimal spanning trees and adjacency matrices for graphs. (x)Have begun to develop a logical mode of thought that will be applicable to computer design, both hardware and software. (xi)Be able to understand sequential logic (xii)Be able to understand sets and relations(xiii) Be able to represent information using zeros and ones.

Course Content. This course provides an introduction to several topics fundamental to computer science. Topics discussed include set algebra, logic, relations and functions, recursion, matrices, graph theory, and methods of proof. Emphasis is on analog arithmetic approach. Set theory; Methods of proof; Recursion; Matrix algebra; Graphs and trees. Application to data structure and graph representations, partial ordered sets, trees, algebraic structures, lattices and Boolean algebra, semi groups ,groups, introduction to grammars and machines and languages, error correcting codes.

Representation of information, two’s complement arithmetic. Combinational logic: switching algebra, canonical forms, Karnaugh maps, combinational network analysis and design, MSI modules. Sequential logic: latch, flip-flop and logic design, state diagram, sequential network analysis and synthesis, register, counter, memory organization.

References

•Bobrow, L.S. and Arbib, M.A. Discrete Mathematics: Applied Algebra for Computer and

Information Science. Philadelphia, PA: Saunders, 1974.

•Dossey, J. A.; Otto, AD.; Spence, L.; and Eynden, C.V.DiscreteMathematics, 3rded. Reading, MA: Addison-Wesley, 1997.

•Balakrishnan, V. K. Introductory Discrete Mathematics. New York: Dover, 1997.