NATIONAL UNIVERSITY

First Year Second Semester Syllabus

Department of Computer Science and Engineering

Four Year B.Sc. Honours Course

National University

Subject: Computer Science and Engineering
Syllabus for Four Year B.Sc. Honours Course
Year wise courses and marks distribution

FIRST YEAR SECOND SEMESTER

Course Code	Course Title	Credit Hours
510221	Digital Systems Design	3.0
510222	Digital Systems Lab	1.5
510223	Discrete Mathematics	3.0
510225	Linear Algebra	3.0
510227	Statistics and Probability	3.0
510229	History of the Emergence of Independent Bangladesh	3.0
	Total Credits in 2nd Semester	**16.5**

Course Code : 510221	Marks : 80	Credits : 3	Class Hours : 45
Course Title :	Digital Systems Design		

Introduction: Introductory concepts, Number System and code, Logic gates and Boolean algebra.

Combinatorial Logic: Combinational Circuits design using logic gates, universal gates. Minimization of switching functions, algebraic simplification, the Karnaugh map, Prime Implement.

Sequential Logic: NAND and NOR latches. Clocked SR. JK D and T flip-flops. FF timing consideration. Master-slave FF.

Complex Sequential logic: Frequency division and counting troubleshooting. Asynchronous ripple up and down counters, counters with any MOD numbers asynchronous IC counters, propagation delay. Parallel up down and up/down counters. Presentable counters. The 74193 counter. Decoding a counter. Cascading counters. Shift registers, IC shift, digital clock, troubleshooting case studies. MSI logic circuits: BCD-to-Decimal decoders, BCD-to-7 segment decoder/drivers. Encoders.

Multiplexer and Demultiplexer: Multiplexer and their applications, Demultiplexers, Troubleshooting case studies, Analog-to-Digital conversion, digital-ramp, successive approximation, flash ADC, Digital-to-Analog conversion: circuits, specifications, Sample and hold circuits, Analog multiplexers, Data acquisition, digital voltmeter.

Memory Devices: Semiconductor memory technologies ROM architecture timing and type of ROM, EPROM, EEPROM, ROM applications. RAM architecture static and dynamic RAM, DRAM structure operation and refreshing. Expanding word size and capacity. Magnetic bubble and CCD memories trouble shooting case studies. Introduction to sequential circuits, formal representation of sequential circuits.

Arithmetic circuits: The half-adder, full adder, parallel adders, 2's complement addition and troubleshooting case studies.

Reference Books:

1) *Digital Systems: Principles and Applications,* Ronald J. Tocci, Neal S. Wildmer.
2) *Hand Book of Modern Digital Electronics,* G. Moazzam and M. Shorif Uddin.
3) *Modern Digital Electronics*, R P Jain.
4) *An Engineering Approach to Digital Design*, William I. Fletcher.

Course Code : 510222	Marks : 40	Credits : 1.5	Class Hours : --
Course Title :	Digital Systems Lab		

Objectives: Minimize and Implementation of Boolean Functions Using Logic Gates, Design Half Adder and Full Adder, Design Half Subtractor and Full Subtractor, Verify the Truth Table of S-R, T, D Flip-Flop, Verify the Truth Table of J-K, Prepare Different Type Shift Resister and Check Its Operation, Design Synchronous Counter, Design Asynchronous Counter, Design Ripple Counter, Design Johnson and Ring counter, Verify the Operation of Encoder and Decoder, Verify the Operation of Multiplexer, De-Multiplexer, Verify the Operation of D/A and A/D Converter.

Course Code : 510223	Marks : 80	Credits : 3	Class Hours : 45
Course Title :	Discrete Mathematics		

Set Theory, Relations, Functions, Graph Theory, Planer Graph and Trees, Direct graphs and Binary Trees, Algebraic Systems, Ordered sets and lattices, Propositional Calculus, Boolean Algebra, Lattices, group theory, cyclic groups, permutation groups, symmetry groups, quotient, homomorphism, Basic structure theory, Prepositional and Predicate logic, Mathematical reasoning and program techniques. Theories with induction. Counting and countability. Graph and trees. Morphisms, Algebraic structures.

Reference Books:

1) *Discrete Mathematics And Its Applications,* Kenneth H. Rosen
2) *Theory and Problems of Discrete Mathematics, Schaum's Outlines,* Lipschutz S., Lipson M., TATA McGraw-Hill.
3) *O. Nicodemi*, Discrete Mathematics CBS, 1989
4) *J. C. Molluzzo and F.Buckley*(Waveland Press, reprinted 1997) ISBN 0-8833-9407
5)

Course Code : 510225	Marks : 80	Credits : 3	Class Hours : 45
Course Title :	Linear Algebra		

Vectors in R^n and C^n. Review of Geometric vectors on R^2 and R^3 space. Vectors in R^n and C^n. Inner product. Norm and distance in R^n and C^n.

Matrices and Determinants: Notion of matrix, Types of matrices, Matrix operation of matrix Algebra, Determinant function, Properties of determinants, Minors, Cofactors, Expansion and evaluation of determinants, Elementary row and column operation and row-reduces echelon matrices, Invertible matrices, Block matrices.

System of Linear Equations: Linear equations, System of linear equations (homogeneous and non-homogeneous) and determinants for solving system of linear equations.

Linear Transformations: Linear transformation, Kernel and image of a linear transformation and their properties, Matrix representation of linear transformation, Change of basis.

Eigenvalues and Eigenvectors : Eigenvalues and eigenvectors, Diagonalization and application.

Reference Books:

1) *Elementary Linear Algebra,* Howard Anton, Chris Rorres
2) *Linear Algebra,* Abdur Rahman

Course Code : 510227	**Marks : 80**	**Credits : 3**	**Class Hours : 45**
Course Title :	**Statistics and Probability**		

Statistics – Definition and scope: past and present, its nature and characteristics, population and sample, descriptive and inferential statistics, scope and applications of statistics, abuse of statistics, sources of statistical data, primary and secondary sources. Data collection tools, types, etc. Construction of questionnaire and other field problems of data collection. Types of data, cross sectional, longitudinal, follow-up and panel data.

Processing of data: measurement scales, variables, attributes, classification, characteristic and basis of classification, array formation, tabulation, different types of tables, frequency distribution.

Presentation of data: graphical presentation of data, details of different types of graphs and charts with their relative merits and dements, concept of explorative data analysis, stem-and-leaf plot, schematic plots, extremes and median, hinges, outliers and 5 number summaries.

Characteristics of statistical data: measures of location, dispersion, skewness, kurtosis and their properties, moments, box -and- whiskers plots, trimean, trimmed mean, interpretation of data with these measures.

Correlation analysis: bivariate data, scatter diagram, simple correlation, rank correlation, correlation ratio, multiple and partial correlations, intraclass and biserial correlation.

Regression analysis: basic concept of regression, regression model, estimation of parameters (OLS method) in regression model, properties of estimators, interpreting the constants, some ideas of polynomial regression, 3-variable regression, estimation of parameters, standard error and other properties.

Association of attributes: concepts of independence, association and disassociation, contingency table, measure of association for nominal and data in contingency tables, partial association: different forms of correlation table.

Reference Books:

1) *Statistics for Business and Economics,* Paul Newbold, William Carlson, Betty Thorne.
2) *Business Statistics,* Md. Abdul Aziz.
3) *An Introduction to Statistics,* M. Nurul Islam.

Course Code : 510229	Marks : 80	Credits : 3	Class Hours : 45
Course Title :	History of the Emergence of Independent Bangladesh		

Introduction: Scope and description of the emergence of Independent Bangladesh.

1. Description of the country and its people.

a. Geographical features and their influence.
b. Ethnic composition.
c. Language.
d. Cultural syncretism and religious tolerance.
e. Distinctive identity of Bangladesh in the context of undivided Bangladesh.

2. Proposal for undivided sovereign Bengal and the partition of the Sub Continent, 1947.

a. Rise of communalism under the colonial rule,
b. Lahore Resolution 1940.
c. The proposal of Suhrawardi and Sarat Bose for undivided Bengal : consequences
d. The creation of Pakistan 1947.

3. Pakistan: Structure of the state and disparity.

a. Central and provincial structure.
b. Influence of military and civil bureaucracy. C. Economic, social and cultural disparity

4. Language Movement and quest for Bengali identity

a. Misrule by Muslim League and struggle for democratic politics.
b. Foundation of Awami League, 1949
c. The Language Movement: context and phases.
d. United front of Haque – Vasani – Suhrawardi: election of 1954, consequences.

5. Military rule: the regimes of Ayub Khan and Yahia Khan (1958-1971)

a. Definition of military rules and its characteristics.

b. Ayub Khan's rise to power and characteristics of his rule (Political repression, Basic democracy, Islamisation)

c. Fall of Ayub Khan and Yahia Khan's rule (Abolition of one unit, universal suffrage, the Legal Framework Order)

6. Rise of nationalism and the Movement for self-determination.

a. Resistance against cultural aggression and resurgence of Bengali culture.

b. The Six Point Movement of Sheikh Mujibur Rahman

c. Reactions, importance and significance of the Six Point Movement.

d. The Agortola Case 1968.

7. The mass-upsurge of 1969 and 11 Point Movement:

a. Background

b. Program significance and consequences.

8. Election of 1970 Non-cooperation movement of March 1971 and the Declaration of Independence by Bangabondhu

a. Election result and centres refusal to comply

b. The Non Co-operation Movement, the 7th March Address of Bangabondhu, Operation Searchlight

c. Declaration of Independence by Bangobondhu and his arrest

9. The War of Liberation 1971

a. Genocide, repression of women, refugees

b. Formation of Bangladesh government and proclamation of Independence

c. The spontaneous early resistance and subsequent organized resistance (MuktiFouz, Mukti Bahini, guerillas and the frontal warfare)

d. Publicity Campaign in the war of Liberation (Shadhin Bangla Betar Kendra, the Campaigns abroad and formation of public opinion)

e. Contribution of students, women and the masses (Peoples war)

f. The role of super powers and the Muslim states in the Liberation war.

g. The Anti-liberation activities of the occupation army, the Peace Committee, Al- Badar, Al Shams, Rajakars, pro Pakistan political parties and Pakistani Collaborators, killing of the intellectuals.

h. Trial of Bangabondhu and reaction of the World Community.

i. The contribution of India in the Liberation War

j. Formation of joint command and the Victory

k. The overall contribution of Bangabondhu and his leadership in the Independence struggle.

10. **The Bangabondhu Regime 1972-1975**

a. Homecoming
b. Making of the constitution
c. Reconstruction of the war ravaged country
d. The murder of Bangabondhu and his family and the ideological turn-around.

Reference Books:

1) *History of the Emergence of Independent Bangladesh,* Professor Dr. Muntasir Mamun

2) *History of the Emergence of Independent Bangladesh, Professor Md. Mozammel Haque*

3) *History of the Emergence of Independent Bangladesh, Md. A Salam, S M Nasir, Md. Nazrul Islam.*