Revised Syllabus

Department of
Computer Science and Engineering

Gono Bishwabidyalay

Syllabus

For 4 Years B. Sc (Honors) in Computer Science and Engineering

Effective From OCT-2018

Department of Computer Science and Engineering
Gono Bishwabidyalay
Savar, Dhaka-1344, Bangladesh.

Syllabus for B.Sc. (Hons.) courses in Computer Science and Engineering for the students admitted in the academic semester effect from October 2018.

Department of Computer Science and Engineering (CSE) at Gono Bishwabidyalay has commenced its academic activities from 2001. From the beginning it has introduced a four years B.Sc. (Hons.) degree. As the field of Computer Science and Engineering is rapidly changing all over the world, syllabus and academic system of CSE need to be updated. In this context, Department of Computer Science and Engineering has decided to update the exiting syllabus started from the semester October 2018.

The Bachelor of Science (Hons.) degree courses in Computer Science and Engineering shall extended over a period of four academic year and shall be divided into eight semesters: First year first semester, first year second semester, second year first semester, second year second semester etc. One semester will extend for a period of 26 weeks. For the purpose of assessment, 100 marks will be assigned to 3 credits and 50 marks will be assigned to 2 credits. 3 credits means 3 contact hours/week in a semester. In the same way 2 credits means 2 contact hours/week in a semester.

Gono Bishwabidyalay
Department of Computer Science and Engineering (CSE)
Syllabus for 4-Year B.Sc. (Hons.) Program

YEAR-1, SEMESTER -1

Course Code	Course Name	Contact Hours Theory / Lab	Credits	Marks
CSE1101	Introduction to Computer System	36	2	50
CSE1102	Introduction to Algorithm	36	2	50
CSE1103	Structured Programming Language	54	3	100
CSE1104L	Structured Programming Language Lab	72	2	50
CSE1105	Math-I (Calculus)	54	3	100
CSE1106	Environmental Science	54	3	100
CSE1107	English-I	36	2	50
CSE1108	Bengali	36	2	50
CSE1109	Viva Voce	-	1	25
Total		**378**	**20**	**575**

YEAR-1, SEMESTER -2

Course Code	Course Name	Contact Hours Theory / Lab	Credits	Marks
CSE1201	Object Oriented Programming Language	54	3	100
CSE1202L	Object Oriented Programming Language Lab	72	2	50
CSE1203	Digital Logic & System Design	54	3	100
CSE1204L	Digital Logic & System Design Lab	72	2	50
CSE1205	Math-II (Co-ordinate Geometry & Vector Analysis)	36	2	50
CSE1206	Physics (Electricity, Magnetism & Optics)	54	3	100
CSE1207	Communicative English	36	2	50
CSE1208	Liberation War of Bangladesh	54	3	100
CSE1209	Viva Voce	-	1	25
Total		**432**	**21**	**625**

YEAR-2, SEMESTER – 3

Course Code	Course Name	Contact Hours Theory / Lab	Credits	Marks
CSE2301	Data Structures	54	3	100
CSE2302L	Data Structures Lab	72	2	50
CSE2303	Electronics & Electrical Circuits	54	3	100
CSE2304L	Electronics & Electrical Circuits Lab	72	2	50
CSE2305	Introduction to Management & Marketing	36	2	50
CSE2306	Statistics & Probability	54	3	100
CSE2307	Math-III (Differential Equation & Special Function)	36	2	50
CSE2308	Industrial Economics	54	3	100
CSE2309	Viva Voce	-	1	25
Total		**432**	**21**	**625**

YEAR-2, SEMESTER –4

Course Code	Course Name	Contact Hours Theory / Lab	Credits	Marks
CSE2401	Advanced Algorithms	54	3	100
CSE2402L	Advanced Algorithms Lab	72	2	50
CSE2403	Digital Image Processing	54	3	100
CSE2404L	Digital Image Processing Lab	72	2	50
CSE2405	Discrete Mathematics	54	3	100
CSE2406	Math-IV (Matrix & Complex Analysis)	36	2	50
CSE2407	Financial & Managerial Accounting	36	2	50
CSE2408	Viva Voce	-	1	25
Total		**378**	**18**	**525**

YEAR-3, SEMESTER – 5

Course Code	Course Name	Contact Hours Theory / Lab	Credits	Marks
CSE3501	Database Management Systems	54	3	100
CSE3502L	Database Management Systems Lab	72	2	50
CSE3503	Microprocessor	54	3	100
CSE3504L	Microprocessor & Assembly Language Lab	72	2	50
CSE3505	Communication Engineering	54	3	100
CSE3506	Automata & Compiler Design	54	3	100
CSE3507	Numerical Methods	36	2	50
CSE3508	Viva Voce	-	1	25
Total		**396**	**19**	**575**

YEAR-3, SEMESTER -6

Course Code	Course Name	Contact Hours Theory / Lab	Credits	Marks
CSE3601	Operating System	54	3	100
CSE3602L	Operating System Lab	72	2	50
CSE3603	Web Engineering	54	3	100
CSE3604L	Web Engineering Lab	72	2	50
CSE3605	Computer Architecture	54	3	100
CSE3606	Computer Peripherals and Interfacing	54	3	100
CSE3607	Cloud Computing	36	2	50
CSE3608L	Mobile Application & Java Programming Lab	72	2	50
CSE3609	Viva Voce	-	1	25
Total		**468**	**21**	**625**

YEAR-4, SEMESTER – 7

Course Code	Course Name	Contact Hours Theory / Lab	Credits	Marks
CSE4701	Computer Networks & Cyber Security	54	3	100
CSE4702L	Computer Networks & Cyber Security Lab	72	2	50
CSE4703	Software Engineering	54	3	100
CSE4704L	Software Engineering Lab	72	2	50
CSE4705	Digital Signal & System	54	3	100
CSE4706	Simulation and Modeling	54	3	100
CSE4707	Computer Graphics & Animation	54	3	100
CSE4708L	Computer Graphics & Animation Lab	72	2	50
CSE4709	Viva Voce	-	1	25
Total		**486**	**22**	**675**

YEAR-4, SEMESTER – 8

Course Code	Course Name	Contact Hours Theory / Lab	Credits	Marks
CSE4801	Artificial Intelligence & Expert System	54	3	100
CSE4802L	Artificial Intelligence & Expert System Lab	72	2	50
CSE 4803	Technical Writing & Presentation	54	3	100
CSE4804	Data ware-housing & Data Mining	54	3	100
CSE4805	IT Entrepreneurship	36	2	50
CSE4806	Project Work	144	4	100
CSE4807	Viva Voce	-	1	25
Total		**414**	**18**	**525**

Grand Total	**2088/1296**	**160**	**4750**

DETAILED OUTLINE OF UNDERGRADUATE CSE PROGRAM

YEAR-1, SEMESTER-1

CSE1101: Introduction to Computer System

Introduction, types and generation of computers, basic organization and functional units, hardware and software, system unit, mother board, system bus, Interface cards, etc. Number systems, BCD and ASCII code, binary arithmetic, logic functions. Key board, mouse, OCR, OMR, MICR, CD-ROM, printers, CRT's, Computer microfilm, hard disk, floppy disk, magnetic tape and other input and output devices. Examples of operating system software - DOS, Windows, UNIX and system utilities, classification of application software, package programs (Word processing, spreadsheet, database package, statistical package, graphic package etc.), High level language, mid-level language, interpreter, compiler and assembler.

Books:

1. Dr. M. Lutfar Rahman and Dr. M. Alamgir Hossain,Computer Fundamentals
2. Computer Fundamental, Schaum's Outline Series.
3. Computer Fundamentals,P. K. Sinha
4. Peter Norton,Introduction to Computers.

CSE1102: Introduction to Algorithm

Introduction:
Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation-Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized complexity

Divide and conquer:
General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication
Basic concepts of Searching and traversal techniques, Greedy method, Dynamic Programming, NP-Hard and NP-Complete problems.

Books:

1. Introduction to Algorithms,
   By Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein
2. Fundamentals of Computer Algorithms.
   By Horowitz, Satraj Sahni, Sanguthevar Rajasekharan,.

CSE1103: Structured Programming Language

Basic Programming concepts and notations; Variables, Constants, Data types; Input and output statements; Control Structures; Functions and Subroutines; Working with structured data: Arrays, Records, Pointers, Link lists; Files; Utility functions; Graph, Strings, Sound using programming language C..

Books:

1. C/C++ and Object Oriented Programming Language, Md. Lutfuzzaman
2. Teach Yourself C, Herbert Schildt
3. Teach Yourself C++,Herbert Schildt
4. Programming Language in C,Schaums Outline Series

CSE1104L: Structured Programming Language Lab

Laboratory Works based on CSE1103.

CSE**1105: Mathematics-I (Calculus)**

Differential Calculus:

Limits, Continuity and Differentiability, L' Hospital's rule. Successive Differentiation: Leibnitz's theorem, Expansion of functions: Rolle's theorem, Mean value theorem, Taylor's and Maclaurin's theorems in finite and infinite forms.

Partial differentiation: Euler's theorem, Tangent and normal, Maxima and Minima, Curvature, Asymptotes.

Integral Calculus:

Definition, Integration by the method of substitution, Integration by parts, Standard Integrals, Integration by successive reduction. Definite Integrals, its properties and use in summing series. Walli's formulae, Improper integrals.

Beta and Gamma function. Determinations of lengths, areas and volumes.

Books:

1. Books: Edwards, J. : Differential Calculus, Radha Publishing House, Kolkata.
2. Das &Mukherjee : Differential Calculus, U. N. Dhar & Sons Private Ltd., Kolkata.
3. Matin, M.A. : Differential l Calculus, Mohammad Brothers, Dhaka.
4. Thomas & Finny : Calculus and Analytical Geometry, Norasa publising house, London.
5. Anton: Calculus with Analytic Geometry, Norasa publishing house, London.
6. Das &Mukherjee : Integral Calculus, U. N. Dhar & Sons Private Ltd., Kolkata.
7. Khanna, M.L. : Integral Calculus, S. Chand & Co., New Delhi.
8. Matin, M.A. : Integral Calculus, Mohammad Brothers, Dhaka.

CSE **1106: Environmental Science**

Environmental Science: Concept & components: perception & scope; history
Environment and life; natural resource (NR); types; access to NR; recycling; Sustainability; different views
Evolution of human society: impact of NR use; degradation &Q pollution: threats.
Ecosystem; concept and components; matter & energy; types of energy, Laws; efficient of energy use
Ecosystem structure & function; biogeochemical cycles, food chain;
Industrialization; degradation & changes in ecosystem; impacts;
Local and global impacts; Challenge to human society
Population, economic development & environment; Bangladesh scenario
Water, importance in Population, economic development & environment; Bangladesh scenario
Water, importance in environment; water cycles; water resources of Bangladesh; conservation and management issues.
Degradation & pollution of Environment; Air, water & noise pollution;
Environmental pollution; domestic, agricultural & industrial; rural & urban, impacts and remediation; atmosphere & climate; local & global impact
Air pollution in Dhaka city; causes and impacts; remediation
Global effect of population growth; Green House effects and global climate change
Gender and environment; Bangladesh social scenario; Women in rural areas
Education, research & awareness; Conservation of environment.
Media & Environment: Press, radio & electronic media in environment management
Role of NGOs & civil society; participatory approach in environment management

Books:

1. Tyler Miller : Environmental Science
2. D. D. Chiras : Environmental Science
3. Cunningham: Principles of Environmental Science
4. Firoz Ahmed: Bangladesh Environment

CSE**1107: English-I**

Communicative Grammar: .Article, Verbs and Tenses, Subject-Verb Agreement Preposition
Listening Skill: Listening to Social English, Listening to small dialogues. From *New Headway* by Liz & John Soars, Oxford University Press.
Speaking skill: Asking questions, inviting, agreeing, disagreeing, drawing attention etc. Controlled speaking practice: speaking in classroom on prepared topics.
Reading skill: Reading small passages for specific answers. Reading passages related to the majors taken by the students. Reading short stories and English Poems for overall idea.
Writing skill: Application (mainly regarding academic affairs and to newspaper editions) Paragraph Dialogue Writing

Books:

1. Leech and Svartvik: A Communicative Grammar of English
2. Raymond Murphy: Intermediate English Grammar
3. Wren and Martin : High School Grammar
4. English Phonetics and Phonology, Peter Roach, Cambridge University Press
5. Dr. M Manirzzaman: Basic English Language Skills
6. Rahman M. Mahbub: From Shakespeare to Robert Frost: Some Timeless Poems, Translated
7. Dean Curry : Read On
8. Pat Caterino Short: English Conversation Book II, Compiled
9. Ann, Baker : Ship or Sheep (with cassettes)
10. Selected Short Stories
11. The News Week, The Time, The Reader's Digest
12. The Norton Anthology of Poetry- 4th Edition

CSE**1108: Bengali (Communication oriented)**

<u>বাংলা ব্যাকরণ</u> **:**

১. ভাষা ও ভাষার বৈশিষ্ট্য।
ভাষারীতি : সাধু, চলিত, আঞ্চলিক ও প্রমিত।
আই.পি.এ (IPA)-এর সাধারণ পরিচিতি।
২. ধ্বনি, বর্ণ ও অক্ষর সংক্রান্ত ধারণা
৩. রূপমূল ও শব্দ : গঠন-প্রক্রিয়া ও শ্রেণিবিভাগ।
৪. বাক্য : গঠন-প্রক্রিয়া ও শ্রেণিবিভাগ।
বাক্যের উপরিতল ও গভীরতলের ধারণা।
৫. বাংলা বানানের নিয়ম।
৬. প্রতিবেদন রচনা ।

<u>বাংলা সাহিত্য</u> **:**

১. কবিতা :
রবীন্দ্রনাথ ঠাকুর : বাঁশি
কাজী নজরুল ইসলাম : মানুষ
২. ছোটগল্প :
রবীন্দ্রনাথ ঠাকুর : সমাপ্তি
সৈয়দ ওয়ালীউল্লাহ : একটি তুলসী গাছের কাহিনী
৩. উপন্যাস (কল্পকাহিনী)
বেগম রোকেয়া : সুলতানার স্বপ্ন
৪. নাটক :
মুনীর চৌধুরী : কবর ।

সহায়ক গ্রন্থাবলি :

১. সুনীতিকুমার চট্টোপাধ্যায় : ভাষা প্রকাশ বাংলা ব্যাকরণ। কলকাতা, ১৯৮৯।
২. মহম্মদ দানীউল হক : ভাষাবিজ্ঞানের কথা। ঢাকা : মাওলা ব্রাদার্স, ২০০২।
৩. আবু সয়ীদ আইয়ুব : রবীন্দ্রনাথ ও আধুনিকতা , ২য় সং। কলকাতা, ১৩৭৭বাং।
৪. মুহম্মদ শামসুল আলম : রোকেয়া সাখাওয়াৎ হোসেন : জীবন ও সাহিত্যকর্ম। ঢাকা : বাংলা একাডেমী, ১৯৮৯।
৫. আতাউর রহমান : নজরুল কাব্য সমীক্ষা। ঢাকা : নজরুল ইন্সটিটিউট, ১৯৭৪।
৬. জিয়াউল হাসান : মুনীর চৌধুরীর নাটক। ঢাকা : মুক্তধারা, ১৯৯০।

YEAR-1, SEMESTER-2

CSE1201: Object Oriented Programming Language

An overview of object oriented programming: The need of the object oriented program procedure language, the object oriented approach, advantage of object oriented program, and characteristics of object oriented languages: object, classes, inheritance, reusability, new data types, polymorphism and overloading.
Object oriented Programming using C ++: An overview of C, concepts of objects and OOP, C++ console I/O, C++ comments, and introduction of class: difference between C and C++, C++ keywords. Assigning objects, structure and Unions. Passing objects to functions, returning objects from functions, friend functions, in-line function and automatic in –lining. Function overloading, operator overloading. Arrays, pointers and reference. Introduction to inheritance, base class access control, using protected members constructor, destructor and inheritance, multiple inheritance. Virtual functions. Virtual functions applying polymorphism. Generic functions and classes, static class members, virtual base classes. C++/I/O and file I/O basics, array based I/O, linkage specifies and the asm keyword. Creating and conversation function.

Books:

1. Object Oriented Programming Language, Robert Lafore
2. C/C++ and Object Oriented Programming Language, Md. Lutfuzzaman
3. Teach Yourself C,Herbert Schildt
4. Teach Yourself C++,Herbert Schildt

CSE1202L: Object Oriented Programming Language Lab

Laboratory Works based on CSE1201.

CSE1203: Digital Logic and System Design

Boolean algebra: Basic theorems and properties, Boolean functions and their simplification. Digital logic gates.
Combinational logic: Adder, Subtractor, Multiplexer and Demultiplexer, Encoder and Decoder, Comparator.
Synchronous Sequential Logic: Flip-flops, Analysis and design of sequential circuits.
Processor logic Design: Processor organization; Arithmetic Logic Unit ; Design of Logic Circuit; Design of ALU;

Control Logic Design: Control organization; Control of Processor unit; PLA control;
Memory devices: Memory Basics; RAM characteristics ; Bipolar RAM;MOS static & MOS Dynamic RAM; ROM; EPROM; EEPROM; Flash memory.
Computer Design: System configuration; Computer instructions; Timing and control; Execution of instruction; design of computer registers; design of control; Computer console.
Microcomputer System Design: Microcomputer & microprocessor organization; Instruction & addressing mode; Stack , Subroutines & interrupts; memory organization; Direct memory address; microprocessor based design

Books:

1. M. Mano, Digital Logic & Computer Design.
2. V.T. Rhone, Fundamentals of Digital System Design.
3. Mark, Zwo Linski, Digital System Design and VHDL.
4. Martin Bolton, Digital System Design with Programmable Logic.

CSE1204L: Digital Logic and System Design Lab
Laboratory works based on CSE1203

CSE1205: Math-II (Co-ordinate Geometry & Vector Analysis)
Co-ordinate Geometry: Change of axes, Pair of straight lines, Circles, Parabola, ellipse, hyperbola
Solid Geometry: Direction Cosines and ratios planes and straight lines.
Vector Analysis: Scalars and vectors, Vector addition and subtraction, scalar and vector products, Vectors differentiation and integration, Gradient, divergence and curl of a vector.

Books:

1. B.C.Das, Integral Calculus.
2. M. Abdul Matin, Integral Calculus.
3. M.R. Spiegel, Vector Analysis
4. M. A. Sattar, Vector Analysis

CSE1206: Physics (Electricity, Magnetism & Optics)

Electricity and Magnetism
Static electricity: Charge, Electric field, and Electric dipole in an electric field, Calculation of electric field from electric dipole. Gauss's theorem and its application. **Current**: Current and current density, Drift speed, EMF, RC circuit. **Electromagnetism**: Ampere's law, Faraday's law, Biot-Savart law, Inductance, Calculation of inductance (LR circuit). **Magnetism**: Intensity of magnetism, Permeability, Susceptibility, Paramagnetic, Diamagnetic and Ferromagnetic substances.
State of Matter: Solid, Liquid and Gas, different types of bonds, Inter-atomic force, Conductor, Insulator and semiconductor, Energy band description of semiconductor, effect of temperature on semiconductor, P-type and N-type semiconductor, P-N junction.
Waves and Oscillations
Oscillations: Simple harmonic motion (SHM), Damped harmonic motion, Forced oscillation, Combination and composition of simple harmonic motions, Lissajous figures. Transverse and Longitudinal nature of waves, Traveling and standing waves, Phase velocity and group velocity.

Sound waves: Velocity of longitudinal wave in a gaseous medium, Doppler Effect.

Physical Optics

Theories of light: Different theories of light, Huygens's principles and constructions.

Interference of light: Coherent source, Relation between path difference and phase difference, Definition of interference, Young's double slit experiment, Interference in thin film, Newton's ring.

Diffraction of light: Fresnel and Fraunhoffer diffraction, Diffraction by single slit, Diffraction by double slit Polarization **of ligh**t: Brewster's law, Malus law.

Books:

1. David Halliday,Robert Resnick,Physics Part-ll,Wiley Eastern Limited.
2. D.K.Cheng,Field and Wave Electromagnetics.
3 .D.N.Vasudeva,Fundamentals of Magnetism and Electricity.
4. K.K.Tewari,Electricity and Magnetism with Electronics.

CSE1207: Communicative English

Communicative Grammar: Voice, Degree of comparison, Linking device, Wh-question, Relative clauses Conditional Sentences

Reading skill: Reading Scientific English, short stories, English poems, understanding meanings of words and sentences, understanding text – organization, understanding figures of speech, Comprehending the meaning of the whole text., Comprehending the gist or summary of the text.

Writing skill: Paragraph, Letter, Report, Précis

Speaking skill: Taking interview, Debating, Situational Conversation & role playing

Listening skill: Listening for an overall idea.

Books:

1. Leech and Svartvik : A Communicative Grammar of English
2. Raymond Murphy: Intermediate English Grammar
3. Wren and Martin : High School Grammar
4. English Phonetics and Phonology, Peter Roach, Cambridge University Press
5. Dr. M Manirzzaman: Basic English Language Skills
6. Rahman M. Mahbub: From Shakespeare to Robert Frost: Some Timeless Poems, Translated
7. Dean Curry : Read On
8. Pat Caterino Short: English Conversation Book II, Compiled
9. Ann, Baker : Ship or Sheep (with cassettes)
10. Selected Short Stories
11. The News Week, The Time, The Reader's Digest
12. The Norton Anthology of Poetry- 4th Edition
13. Michael A. & Pyle, M.A: Cliffs TOEFL

CSE1208: Liberation War of Bangladesh

১. কোর্স ও বিষয় পরিচিতি: ভূমিকা ।

২. প্রাচীন বাংলার ভৌগোলিক অবস্থান ও ভূ-প্রকৃতি, প্রাগৈতিহাসিক পটভূমি, বাংলার প্রাচীন জনগোষ্ঠীর নৃতাত্ত্বিক পরিচয়।

৩. গুপ্ত- পাল ও সেন বংশ : রাজ্যশাসন পদ্ধতি, ধর্ম ও সামাজিক শ্রেণীবিন্যাস/জাতিভেদ প্রথা, পূজা- পার্বণ, উৎসব ও বিনোদন, ভাষা- সাহিত্য-শিল্পকলা ও অর্থনীতি।

৪. তুর্কী বিজয় : সুফিবাদ ও বাংলার সুফি-দরবেশ, বৈষ্ণব ধর্ম : শ্রীচৈতন্য দেব, সুলতানী বাংলা : রাজ্যশাসন ব্যবস্থা, হিন্দু-মুসলমানের সামাজিক জীবন ও সম্পর্ক, শিক্ষা-সাহিত্য- ভাষা ও অর্থনীতি।

৫. মোগল আমল: শাসনব্যবস্থা, সামাজিক শ্রেণীবিন্যাস, হিন্দু-মুসলমানের অবস্থান, নারীর মর্যাদা, সামাজিক আচার-অনুষ্ঠান ও রীতি-নীতি, ভাষা-শিক্ষা-সাহিত্য-শিল্পকলা ও অর্থনীতি।

৬. বাংলায় ইউরোপীয়দের আগমন ও বাণিজ্যিক প্রয়াস, ইস্ট-ইন্ডিয়া কোম্পানির বাণিজ্যিক প্রতিষ্ঠা ও রাজ্যলিপ্সা, পলাশীর যুদ্ধ।

৭. ব্রিটিশ সাম্রাজ্যের গোড়াপত্তন : শাসনব্যবস্থা ও প্রতিক্রিয়া, হিন্দু সমাজ-সংস্কার আন্দোলন, ইংরেজি শিক্ষার প্রচলন, প্রাচ্য ও প্রতীচ্য সংস্কৃতির দ্বন্দ্ব, সন্ন্যাসী ও ফকির বিদ্রোহ, ওয়াহাবী আন্দোলন, ফারায়জী আন্দোলন, সাঁওতাল বিদ্রোহ, কৃষক আন্দোলন, সংবাদপত্র ও সাহিত্য প্রকাশনা, ১৮৫৭ সালের স্বাধীনতা সংগ্রাম, মুসলিম জাগরণ, বঙ্গভঙ্গ, বঙ্গভঙ্গ রদ, ঢাকা বিশ্ববিদ্যালয় প্রতিষ্ঠা, অসহযোগ ও খিলাফত আন্দোলন, হিন্দু ও মুসলমানদের মধ্যে পৃথক জাতীয় চেতনার লালন, দ্বিতীয় বিশ্বযুদ্ধ, পাকিস্ড়ান আন্দোলন, দ্বিতীয় বঙ্গভঙ্গ ও পাকিস্ড়ানের অভ্যুদয়।

৮. পাকিস্ড়ান পর্ব : পূর্ব বাংলার সামাজিক, রাজনৈতিক, অর্থনৈতিক ও সাংস্কৃতিক পরিস্থিতি, রাষ্ট্রভাষা আন্দোলন: বাঙালি জাতীয়তাবাদের উদ্ভব, পাকিস্ড়ানী শাসন-শোষণের বিরুদ্ধে প্রতিবাদ আন্দোলন, যুক্তফ্রন্ট ও একুশ দফা, ৬ দফা (স্বায়ত্বশাসন) দাবি, ৬৯-এর গণ অভ্যুত্থান, নির্বাচনোত্তর পাকিস্তানী ষড়যন্ত্র,৭১-এর গণহত্যা ও মুক্তিযুদ্ধের সূচনা।

৯. বাংলাদেশ প্রতিষ্ঠার সংগ্রাম: স্বাধীনতা।

১০. স্বাধীন বাংলাদেশের সামাজিক, রাজনৈতিক, অর্থনৈতিক, সাংস্কৃতিক ও ভাষাগত অগ্রগতির পরিচয়।

Books:

১. অতুল সুর :*প্রাগৈতিহাসিক ভারত*

২. অতুল সুর :*বাঙালির নৃতাত্ত্বিক পরিচয়*

৩. অতুল সুর :*বাংলার সামাজিক ইতিহাস*

৪. অজয় রায় : *বাঙলা ও বাঙালী*

৫. আব্দুল করিম :*বাংলার ইতিহাস : সুলতানী আমল*

৬. আব্দুল করিম :বাংলার ইতিহাস : মুঘল আমল

৭. আবদুর রহিম :*বাংলার সামাজিক ও সাংস্কৃতিক ইতিহাস* (১ম খন্ড)

৮. আবদুর রহিম :*বাংলার সামাজিক ও সাংস্কৃতিক ইতিহাস* (২য় খন্ড)

৯. আবদুর রহিম ও অন্যান্য : বাংলাদেশের ইতিহাস , ১২শ সং

১০ নীহাররঞ্জন রায় : *বাঙালির ইতিহাস (আদিপর্ব)*, ২য় সং

১১. বিনয় ঘোষ : *বাংলার সামাজিক ইতিহাসের ধারা*

১২. সৈয়দ আলী আহসান : *বাংলাদেশের সংস্কৃতি*

১৩. আহমদ মাযহার : *বাঙালির মুক্তিযুদ্ধের ইতিহাস*

১৪. আবুল কাসেম ফজলুল হক: *মুক্তি সংগ্রাম*

১৫. আবুল কাসেম ফজলুল হক : *একুশে ফেব্রুয়ারি আন্দোলন*

১৬. বদর উদ্দীন উমর :*ঈশ্বরচন্দ্র বিদ্যাসাগর ও উনিশ শতকের বাঙালি সমাজ*

YEAR-2, SEMESTER-3

CSE2301: Data Structures

Introduction: Data Structures Operations, Algorithms: Complexity, Time space trade-off.

Data Structures: Arrays, Lists, Pointers , Structures, Iterations, Stacks, Stack Frames, Recursion- Recursive Functions, Example: Factorial, Fibonacci.

Searching: Sequential Searches, Linear Search, Binary Search, Trees

Linked List: Traversing, Inserting, Deleting, Searching, Memory Allocation; Garbage Collection, Header Linked List, Two-way List

Tree: Binary Tree, Binary Search Tree, Complete Binary Tree, Heap, Huffman's algorithm, General Tree

Queues: Priority Queues, Heaps

Sorting: Bubble, Heap, Insertion, Selection, Quick, Radix, Merge

Searching Revisited: Red-Black trees, AVL trees, General trees, Hash Tables

Graphs: Minimum Spanning Tree, Dijkstra's Algorithm, Depth first and breadth first search, Huffman Encoding

Books:

1. Seymour Lipchutz,adapted by G.A. Vijayalakashmi Pai,Data Structure
2. ISRD,Data structures using C,Tata McGraw-Hill.
3. Ford. Topp,Data Structures with C++

CSE2302L: Data Structures Lab

Laboratory works based on CSE2301.

CSE 2303: Electronics & Electrical Circuits

Instrumentation: Avometer, signal generator, oscilloscope, pH-meter, spectrophotometers, thermostats.

Networks Analysis: Kirchhoff's laws; Wheatstone bridge, Superposition theorem; Millman's theorem; Reciprocity theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Mesh and Node circuit analysis, Reduction of complicated networks, T and p-section network.

Filters: Properties of symmetrical networks, Characteristics impedance, Filter fundamentals, Different types of filters, high pass, low pass, band pass and band elimination filter, Active Filters.

Semiconductor Diodes: Semiconductor, n-and p-type semiconductors, p-n junction as a diodes and their V-I characteristics, Zener diode, half-and full wave rectifiers, voltage regulation using Zener diodes.

Transistor: Transistor action, transistor biasing, DC characteristics of CE, CB and CC configurations.

Transistor Amplifiers and Oscillators: CE, CB and CC amplifiers, current, voltage and power gains, frequency responses, principles of feedback, positive and negative feedback, oscillators and masturbators, astable and monostable multivibrator.

Amplifiers: Voltage and current amplifiers. Operational amplifiers. Off-set null adjustments. Differential input and output impedance, frequency response and noise.

Oscillators: Hartley, Colpitts & Wine-Bridge oscillators. Introduction to JFET, MOSFET, PMOS, NMOS, AND CMOS. Biasing and application in switching circuits.

Optoelectronic Devices: PN photodiode, Phototransistor, Solar cell, Photoconductive cell, Photovoltaic, Sensors, LED, LCD, Alphanumeric display, Photo couplers, Photodiode, LDR.

Books :

1. R.L Boylestad,Electronic Devices and Circuit
2. R. K. Mozumdar,Principles of Electronic Circuits
3. Jacob Millman and Christos C. Halkias, Electronic Devices and Circuits, McGraw-*Hill Inc*.
4. Albert D. Helfrick and William David Cooper, Modern Electronics Instrumentation and Measurement Techniques, *Prentice Hall*

CSE 2304L: Electronics & Electrical Circuits Lab

Laboratory experiments based on CSE2303.

CSE2305: Introduction to Management & Marketing

Modern management- A digital focus: Importance of management, role of management, definition of management, management process and goal attainment

Principles of planning and making decisions : Definition of planning, purposes of planning, Advantage & potential disadvantages of planning, primacy of planning, steps in the planning process, organizational objectives, areas of organizational objectives, guidelines for establishing quality objectives, Elements of decision situation, Decision making process, Decision making conditions.

Fundamentals of Organizing: Definition of organizing, organizing process, classical organizing theory

Fundamentals of Influencing and Communication through leading and motivating: Define influencing, influencing subsystem, communication, communication barriers, definition of leadership, leader vs. manager, trait approach to leadership, situational approach to leadership, definition of motivation, different theories of motivation.

Principles of Controlling: Control & controlling, standard, controlling process, types of control

Introduction to Marketing: Definition of marketing, marketing process, marketing management orientation, marketing mix and marketing plan.

Product marketing :(Hardware marketing) -Definition, levels of product, types of product, product decision.

Service marketing :(Software marketing)-Definition, nature and characteristics of service, types of service marketing, 7p's of service marketing.

Books:

1. C.M. Kornberger,managing and organization:an introduction to theory and practices.
2. Y.Gabriel S. Fireman,Organizing and organizations:an introduction.
3. Mantel merediths,Core concepts:Project management in Practice.
4. Management body of knowledge.
5. Samuel C. Certo, "Modern Management".
6. Philip kotler, "Principles of Marketing"

CSE2306: Statistics & Probability

Definition and Introduction of Statistics,
Graphical and Diagrammatical Presentation: Graphs and Diagrams
Measures of Central Tendency: Arithmetic Mean, Geometric Mean, Harmonic Mean, Median , Mode
Measures of Dispersion: Range, Mean Deviation, Standard Deviation, Coefficient of Variation
Shape Characteristics of Distribution: Moments, Skewness, Kurtosis
Probability: Concepts of Probability, Random Variable, Moments of Random Variable
Probability Distribution: Binomial Distribution, Poisson Distribution, Uniform, Normal Distribution

Books:

1. Hines, W.W, Montgomery, D.C. etl.
2. Probability and Statistics in Engineering.

CSE2307: Math-III (Differential Equation & Special Function)

Differential Equations: Degree and order of ordinary differential equations. Formulation of differential equations. Solution of first order differential equations by various methods. Solution of general linear differential equations of second and higher orders with constant coefficients. Solution of homogeneous linear equations. Solution of differential equations by operator methods. Concept of partial differential equations.
Laplace Transform: Definition. Laplace transform of some elementary functions. Inverse Laplace transformations. The unit step function. Periodic function. Evaluation of improper integrals.
Fourier Analysis: Fourier series, Fourier integral, Fourier transforms.
Special Function: Gamma and Beta functions, Bessel functions, Orthogonal functions, Legendre.

Books:

1. B.D. Sharma, Differential Equations
2. F. Ayres, Differential Equations
3. M. R. Spiegel, Laplace Transform
4. P.N. Chatterjee, Special Functions.

CSE2308: Industrial Economics

The Fundamental of economics: Basic Concepts, The Scope and method of economics, The economic Problem
Graphical and Diagrammatical Presentation: Graphs and Diagrams
Microeconomics: Economic Perspectives, Basic elements of supply and demand , Application of supply and demand , Demand and Consumer Behavior
Production and Business Organization: Production Function, Analysis of Costs, Analysis of Markets, Nature of Firms
Basic Concepts of macroeconomics: Flows of National Income, Measurement of National Income, Production and Economic Growth, Economic Instability and Containment policies, International Trade and Foreign Exchange
Equilibrium: Equilibrium of supply and demand

Books:

1. Case & Fair, Principles of economics.
2. William Boys & M Melvin, Fundamentals of economics.
3. D. Salvatore, Introduction of Intern. Economics.

YEAR-2, SEMESTER –4

CSE2401: Advanced Algorithm

The role of algorithm in computing: What is algorithm, Algorithm as a technology, analyzing algorithm, Designing algorithm
Growth of functions: Asymptotic notation**,** Standard notation and common function
Divide and conquer approach: What is divide and conquer approach, Analyzing the divide and conquer algorithm.
Heap sort: Heaps**,** Maintaining the heap property**,** Building a heap**,** The heap sort algorithm
Quicksort: Description of quicksort**,** Performance of quicksort**,** Analysis of quicksort
Dynamic Programming: What is dynamic programming**,** How it works, Elements of dynamic programming Example Analysis (Rod cutting problem, Matrix chain multiplication, Longest Common Subsequence)
Greedy Algorithm: How greedy algorithm differs from dynamic programming**,** Elements of the greedy strategy**,** Huffman code
Elementary Graph Algorithm: Representation of graphs**,** BFS algorithm**,** DFS algorithm**,** Prim's & Kruskal's algorithm

Books:

1. Computer Algorithms, Henry F. Korth
2. Algorithm, Schaums Outline Series
3. Udi Manber. Introduction to Algorithms.
4. Anny V. Levitin. Introduction to the design and analysis of Algorithms

CSE 2402L: Advanced Algorithm Lab
Laboratory works based on CSE2401.

CSE2403: Digital Image Processing

Digital Image Fundamentals: Elements of Visual Perception. Light and the Electromagnetic Spectrum. Image Sensing and Acquisition, Key Stages of Image Processing**,** Image Sampling and Quantization, Some Basic Relationships between Pixels, Linear and Nonlinear Operations, Image Processing Applications
Image Enhancement in the Spatial Domain: Basic Gray Level Transformations. Histogram Processing, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters, Image Histograms
Color Image Processing: Color Fundamentals, Color Models, Pseudo color Image Processing, Basics of Full-Color Image Processing, Color Transformations, Smoothing and Sharpening, Color Segmentation, Image Segmentation, Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation., Segmentation by Morphological Watersheds.
Morphological Image Processing: Structuring Elements: Dilation and Erosion, Opening and Closing, Thinning and Thickening**,** Extensions to Gray-Scale Images.
Edge Detection: Different Edge**,** Edge Detection Principle**,** Edge Detecting Operators**,** Edge Detecting Algorithms Comparisons between different edge detectors
Image Compression: Compression Goals**,** Image Compression and Reconstruction**,** Image Compression Algorithms Compression Ratio, Fidelity Criteria
Books:

1. K. Jain, Fundamentals of Digital Image Processing.
2. R. C. Gonzalez and R.E. Woods, Digital Image Processing.
3. Rafael C. Gonzalez, Richard E. Woods and Steven L. Eddins, Digital Image Processing Using MATLAB.
4. Nick Efford, Digital Image Processing using Java 6.

CSE2404L: Digital Image Processing Lab
Laboratory works based on CSE2403

CSE 2405: Discrete Mathematics
Introduction to Discrete Mathematical Structure: Set theory, Mathematical reasoning and proof techniques, Prepositional calculus and predicate calculus. **Elementary Number Theory:** Relations, Function, Algebraic structures , Graph theory , Paths and trees, Generating Function, Permutation groups. **Discrete Probability:** Induction, Contradiction and recursion, counting, Principles of inclusion & execution, recurrence relations, rings and groups.

Books:

1. Rosen, K.R., Discrete Mathematics & its Application.
2. Lipschutz S., Lipson M., Discrete Mathematics, Schaum's Outline Series.
3. J. P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications to
4. Computer Science.
5. K.D. Joshi, Fundamentals of Discrete Mathematics.

CSE 2406: Mathematics IV (Matrix & Complex Analysis)

Matrix*:* Concepts of Matrices, Different types of matrices. Transpose, Adjoin and Inverse of a matrix, Determinants, Cramer's Rule, Solution of linear equations. The characteristics roots and the characteristic equation of a matrix, Determination of Eigen values and Eigen vectors of a square matrix, Caley Hamilton theorem.

Complex Variables: Complex number system. Complex function, Analytic function, Cauchy Riemann equations, Cauchy's Integral theorem, Cauchy's Integral formula, Mapping and conformal mapping of elementary functions, Poles and singularities.

Books:

1. Md. Abdur Rahman, Linear Algebra.
2. F. Ayres, Matrices
3. M. R. Spigel, Complex Variable
4. M.L.Khanna, Complex variables.

CSE2407: Financial & Managerial Accounting

Accounting in Action: What is Accounting, Three Activities of Accounting

The Building Blocks of Accounting: Ethics in Financial Reporting, Measurement Principles, Assumptions

The Basic Accounting Equation: Assets, Liabilities, Owner's Equity

Using the Basic Accounting Equation: Transactions Analysis, Summary of Transactions Analysis, Income Statement, Owner's Equity Statement, Balance Sheet

The Recording Process: Debits and Credits

Steps in The Recording Process: The Journal, The Ledger, The Trial Balance, Liquidity Ratios, Profitability Ratios, Solvency ratios, Summary of Ratios, Fixed Cost, Mixed Costs, Variable Cost

Books:

1. Accounting Principles: 10th Edition by weygandt | kimmel | kieso
2. Managerial Accounting: 11th Edition by garrison| noreen| brewer

YEAR-3, SEMESTER -5

CSE3501: Database Management Systems

Basic concepts of data and database systems. Data models. Query languages: Relational algebra and calculus, SQL; Query processing, interpretation, cost estimation, optimization; Functional dependency and normalization; File organization; Data Dictionary and directory systems; Database management: Database administration, security and integrity; Introduction to distributed database.

Books:

1. A. Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts.
2. Ramez Elmasri and S.B. Navathe, Fundamentals of Database Systems.
3. D. Kronke and D. Auer, Database Concepts.
4. C. Churcher, Beginning Database Design, From Novice to Professional.

CSE3502L: Database Management Systems Lab

Laboratory works based on CSE3501

CSE3503: Microprocessor

Introduction to different types of microprocessors and programmable circuits. Study of primitive microprocessors: architecture, instruction set, interrupt structure, interface I/O devices. Distinguishing features of some advanced microprocessors from Intel, Motorola, IBM, Sin and so on.

Books:

1. Mohammed Rafiquzzaman, Ph.D., Microprocessors and Microcomputer Based System Design.
2. Yu-Cheng Liu, Glenn A. Gibson, Microcomputer Systems: The 8086/8088 Family.
3. Aditha Mathur, Introduction to Microprocessors.
4. Douglas V. Hall, Microprocessors and Interfacing: Programming and Hardware.

CSE 3504L: Microprocessors and Assembly Language Lab

Laboratory works based on CSE3503.

CSE3505: Communication Engineering

Introduction: data communications**,** networks, the internet**,** protocols and standards

Network Models: layered tasks, the osi model, layers in the osi model**,** tcp/ip protocol suite **,** addressing

Data and Signals: analog and digital**,** periodic analog signals**,** digital signals**,** transmission impairment**,** data rate limits

Digital Transmission: digital-to-digital conversion**,** analog-to-digital conversion, transmission modes
Analog Transmission: digital-to-analog conversion**,** analog-to-analog conversion
Bandwidth Utilization: Multiplexing and spreading**:** multiplexing**,** spread spectrum
Transmission Media: guided media**,** unguided media: wireless
Error Detection and Correction: introduction, block coding**,** linear block codes, cyclic codes**,** checksum

Books:

1. William Stallings, Data and Computer Communications, PHI
2. Behrouz Forouzan, Introduction to data communication and networking, Tata McGraw Hill Publishing Company Ltd.
3. Halsall F., Data Communication, Computer Networks and Open Systems, Addison Wesley
4. Leon-Garcia A. & Widjaja I., Communication Networks, Tata McGraw Hill
5. Bertsekas & Gallagar, Data Networks, PHI

CSE 3506: Automata & Compiler Design

Formal Language and Regular Expressions: Languages, Definition Language regular expressions, Finite Automata-DFA, NFA. Conversion of regular expression to NFA, NFA to DFA, Applications of Finite Automata to lexical analysis, lex tools.
Context Free grammars and parsing: Context free grammars, derivation, parse trees, ambiguity LL (K) grammars and LL (1) parsing.

Bottom up parsing handle pruning LR Grammar Parsing, LALR Parsing, Parsing ambiguous grammars, YACC Programming specification.

Semantics: Syntax directed translation, S-attributed and L-attributed grammars, and Intermediate code-abstract, syntax tree, translation of simple statements and control flow statements.

Context sensitive features-Chomsky hierarchy of languages and recognizers. Type checking, type conversions, equivalence of type expressions, overloading of functions and operations.

Run time storage: Storage organization, storage allocation strategies scope access to now local names, parameters, language facilities for dynamics storage allocation.

Code optimization: Principal sources of optimization of basic blocks, peephole optimization, flow graphs, data flow analysis of flow graphs.

Code generation: Machine dependent code generation, object code forms, generic code generation algorithm, register allocation and assignment using DAG representation of Block.

Books:

1. Principles of compiler design -A.V. Aho. J.D. Ullman; Pearson Education.
2. Modern Compiler Implementation in C- Andrew N. Apple, Cambridge University Press.

CSE3507: Numerical Methods

Introduction: Numerical Computing, Errors in Computation, Stability and convergence. **Roots of Nonlinear Equations:** Bisection, False position and Newton-Raphson method. **Solution linear equations:**

Gaussian Elimination, Gauss-jordan Method, Jacobi's and Gauss-Seidal Method. **Regression:** Linear and exponential. **Interpolation:** Lagrange and Newton Polynomials. **Numerical Differentiation and Integration:** Trapezoidal and Simpson. **Numerical Solution of ordinary Differential Equation:** Taylor series, Picard, Runge-Kutta, Eular's method.

Books:

1. E Balagurusamy, Numerical Method.
2. Robert J. Schilling and Sandra Harries, Applied Numerical Method for Engineers.
3. A. R. Vasishtha, Vipin Vasishtha, Numerical Analysis.
4. S. Balachandra Rao & C.K. Shantha, Numerical Method.
5. Kendall Atkinson, Elementary Numerical Analysis

YEAR-3, SEMESTER-6

CSE 3601: Operating System

Introduction to operating system concepts.

Process management*:* Inter process communication, concurrency and scheduling.

Memory management: Addressing, virtual memory techniques (paging, segmentation).

File systems: Implementation, security and protection. Management of I/O. Deadlock handling. Distributed operating systems. Hardware/Software concepts, communication and synchronization.

Books:

1. Sylberschatz, Galvin, Gagne, Operating System Concepts.
2. Andrew S. Tanenbaum, Operating System: Design and Implementation.
3. A. N. Haberman, Introduction to Operating System.
4. Andrew S. Tanenbaum, Modern Operating System.

CSE 3602L: Operating System Lab

Laboratory works based on CSE 3601

CSE 3603: Web Engineering

Web Engineering: Attributes of Web based system and Application, Web App Engineering Layers, Web Engineering Process

Web Apps Analysis: Requirement Analysis, Analysis Model, Web Apps Estimation, Content Model.

Web Apps design: Design issues of Web Apps, Interface Design, Typography, Layout design, Aesthetic Design, Content Design, Architecture Design, Navigation Design, Object Oriented Hypermedia Design, Design Metrics for web Apps.

Web Apps Implementation: Client side scripting: Java Script, AJAX, JQuery; Server Side Scripting: ASP.NET, PHP; Framework: PHP MVC frameworks (Code Igniter, Symfony, Zend, CakePHP) ASP.NET MVC Framework, Web Service.

Web Apps Security: Encryption techniques (digital signatures, certificates, PKI), Security threats, securing client/server interactions, Vulnerabilities at the client (desktop security, phishing, etc.) and the server (cross-site scripting, SQL injections, etc.), Building Secure Web Apps.

Testing Web Apps: Content Testing, User Interface Testing, Navigation Testing, Configuration Testing, Security Testing, Performance Testing.

Maintenance of Web Applications: Web Server and Database server load balancing, web apps performance assessment, Application usage monitoring and report generation

Books:

1. Roger Pressman and David Lowe, Web Engineering, *Tata McGraw Hill Edition*, 2008
2. Dino Esposito Programming Microsoft ASP.NET 2.0, *Microsoft Press, 2005*
3. J. Castagnetto,H. Rawat, S. Schumann, C. Scollo and D. Veliath, Professional PHP Programming , *Wrox Publications, 1999*.
4. Leon Atkinson, Core PHP Programming, *Prentice Hall Professional, 2004*.

CSE 3604L: **Web Engineering Lab**

Laboratory works based on CSE 3603.

CSE 3605: Computer Architecture

Information representation; Measuring performance; Instructions and data access methods: operations and operand of computer hardware, representing instruction, addressing styles; **Arithmetic Logic Unit (ALU) design**: arithmetic and logical operations, floating point operations, designing ALU; Processor design: datapaths – single cycle and multicycle implementations; **Control Unit design** – hardwared and microprogrammed; Hazards; Exceptions; **Pipeline**: pipelined datapath and control, superscalar and dynamic pipelining; **Memory organization**: cache, virtual memory; channels; DMA and interrupts; Buses; **Multiprocessors:** types of multiprocessors, performance, single bus multiprocessors, multiprocessors connected by network, clusters.

Books:

1. Computer Architecture and Organization, John P. Hayes
2. Digital Logic and Computer Design, Morris Mano
3. Digital Logic Design, Floyed

CSE 3606: Computer Peripherals and Interfacing

Introduction to I/O organization of a typical computer; Computer peripheral interfacing input and output devices; Microcomputer ports: Serial, Parallel, Mouse; I/O multi-processing interfacing; Inter Processor communication schemes; Human computer interface; Virtual reality: Interface for real application, wireless interfacing; Optical computing dvices; Intelligent interface machines.

Books:

1. Driscoll, F.F. Couglin, R.F. and Villanucci, Data Acquisition and Process Control with the M68HC11 Microcontroller.
2. Hall, Douglas V., Microprocessors and Interfacing / Programming and Hardware.
3. Triebel, Walter A. and Singh Avtar, The 8088 and 8086 Microprocessors: Programming, Interfacing, Software, Hardware and Applications.
4. Mazidi, Muhammad A. and Gillispie Mazidi, Janice Catherine, 80X86 IBM PC and Compatible Computers. Assembly Language, Design and Interfacing, Vol 1 and 2.

CSE3607: Cloud Computing

The future of client server computing enabling Technologies, the transformational system. Concept and Evolution of Cloud Computing, Service Models and Architecture of Cloud Computing, Management Issues in Cloud, Security Issues in Cloud, Exposures to Some Open Source and Commercial Clouds, Exposure to the Research Issues in Cloud Computing, Distributed System Models: Parallel Computing, Virtualization, Cloud Platform Architectures, Amazon AWS, Microsoft Azure, Google App Engine, Google MapReduce, Yahoo Hadoop, Eucalyptus, Nimbus, OpenStack, Service-Oriented Architectures, Cloud Programming, Grid Computing, Peer-to-Peer Computing.

Books:

1. Client / Server Computing - Patrick Smith & Steave Guengerich,
2. Client/Server Computing - Dawna Travis Dewire
3. Distributed and Cloud Computing: Clusters, Grids, Clouds, and the Future Internet - Kai Hwang, Jack Dongarra & Geoffrey C. Fox

CSE3608L: Mobile Application & Java Programming Lab

Introduction to Android and Mobile Devices, Setting up Development Environment, Application Architecture and Lifecycle, Java Language Basics and Syntax, Object Oriented Programming in Java, Vertical and Horizontal Libraries in Java, Object Oriented Principles and Practice, Building Android Applications, Android User Interface, Advanced Android User Interface, Common Controls, Android Application Components: Activity, Broadcast Listener, Service, Content Provider, Data Storage and Relational Database: SQLite, Maps, Geocoding and Location Based Services, Communication with Internet, RESTful Web Services, Working with Multimedia and Content Providers in Android, Basic Game Development Concepts, Performance Tuning, Some More about Object Oriented Programming, Debugging, Testing & Deploying Android Applications (with Digital Signature).
Object Oriented Programming Concepts and features, Java as OOP language, Comparison between Java and C++ as OOP, Typical Java Development Environment. Java's Primitive Data Types, Operator (arithmetic and logical) and Control Structures. Java Classes, Objects, Methods and instance variables, Program Modules in Java, static Methods, static Fields, Methods with Multiple Parameters, Java API Packages. Arrays, Enhanced for Statement, Passing Arrays to Methods, Variable-Length Argument Lists, Using Command-Line Arguments. Encapsulation and data hiding, the notions of data abstraction and abstract data types (ADTs), use of static variables and methods, Inheritance, Polymorphism, Packages. Exception and error handling. To create, read, write and update files, to retrieve information about files and directories, Java input/output stream class hierarchy, differences between text files and binary files, Sequential-access and random-access file processing. The design principles of graphical user interfaces (GUIs), Understanding and implementing Java networking applications with sockets and datagrams, to understand how to implement Java clients and servers that communicate with one another, to understand how to implement network-based collaborative applications

Books :

1. Ed Burnette , Hello, Android
2. Andrew Atkinson, Android Mandroid
3. Donn Felker, Android Application Development All-in-one for Dummies
4. Sams OutLines, Sams Teach Yourself Android Application Development in 24 Hours
5. Deitel & Deitel, Java 2: Complete Reference, *McGraw-Hill*
6. Cay Horstmann and Gary Cornell, Core Java Vol. 1 & 2, The Sun Microsystems Press Java Series, *Prentice Hall*
7. Ivor Horton, Beginning Java 2: JDK, *John Wiley & Sons*
8. H. Schildt, Java How To Program, *Prentice Hall*

YEAR-4, SEMESTER -7

CSE 4701: Computer Network & Cyber Security

Basic concepts, server, workstation, data communication, signaling, analog & digital communication, synchronous, asynchronous, circuit and packet switching. Network topology: Bus, tree ring and star topology, transmission media, coaxial, UTP and optical fiber. LAN, MAN, WAN, LAN architecture, IEEE standard protocols for LANs and MANs, Internetworking, bridges, routers, gateway. Protocol: OSI model and TCP/IP, TCP/IP protocol suit, layers, comparisons, TCP/IP addressing, address classes, Ipv4, Ipv6, address masking, network address, DNS and DHCP. Domain: Primary and secondary domain, host, name server, resolve, reverse resolution, DHCP assigning dynamic IP. DNS and internet configuration: Root server, cache file, boot file, zone, primary and secondary zone, reverse zone, DNS records such as A, CNAME, MX, NS, PTR, SOA etc, hosts file.

Network Security: Preliminary concepts and definitions:

Security, Cyber security, information security requirements, Secret vs public key, cryptography, Threats, models of attack, classification. **Symmetric key encryption:** Stream ciphers, Perfect ciphers, Properties and limits of stream ciphers, RC4 (with algorithms),

Books:

1. Andrew S. Tanenbaum, Computer Network.
2. W. Stallings, Data Communication and Computer Network.
3. Gilbert Held, Data Communication Networking Devices.
4. D.E. Comer, Computer Networks and Internets with Internet Applications.

CSE 4702L: Computer Networks & Cyber Security Lab

Laboratory works based on CSE 4701.

CSE 4703: Software Engineering

Introduction to system engineering and software engineering. Software requirements analysis, modeling and specification.

Software Designing: Principles, concepts (abstraction, refinement, modularity, hierarchy etc), models and specification.

Software testing: Objective and principles, testability, testing design, implementation models and documentations, verification, validation and debugging. Quality factors and methodologies for different software engineering phases. Software project management issues.

Books:

1. Ian Sommerville, Software Engineering.
2. Roger S. Pressman, Software Engineering.
3. David Alex Lamb, Software Engineering.
4. Carlo Ghezzi, Mehdi Jazayeri and Dino Mandroili, Fundamentals of Software Engineering.

CSE 4704L: Software Engineering Lab

Student will develop software in group/individually using any object oriented programming language.

Books:

1. Diane Zak, Programming With Visual Basic 6, Enhanced Edition.
2. Michael Vine, Visual Basic Programming for the Absolute Beginner.
3. Kevin Loney, Oracle Database 10g: The Complete Reference.
4. Richard Niemice, Oracle Database 10g Performance Tuning and Techniques

CSE 4705: Digital Signal & System

Introduction: signals, systems and signal processing, classification of signals, the concept of frequency in continuous time and discrete time signals, analog to digital and digital to analog conversion, Sampling and quantization. **Discrete time signals and systems:** Discrete time signals, discrete time systems, analysis of discrete time linear time invariant systems. Discrete time systems described by difference equations, implementation of discrete time systems, correlation and convolution of discrete time signals. **The z-transform:** Introduction, definition of the z-transform, z-transform and ROC of infinite duration sequence, properties of z-transform inversion of the z-transform, the one-sided z-transform. **Frequency analysis of signals and systems**: Frequency analysis of continuous time signals, Frequency analysis of discrete time signals, Properties of Fourier transform of discrete time signals, Frequency domain. Characteristics of linear time invariant system, linear time invariant systems as frequency selective filters, Inverse systems and deconvolution. **The Discrete Fourier Transform:** The DFT, Properties of the DFT, Filtering method based on the DFT, Frequency analysis of signals using the DFT. **Fast Fourier Transform Algorithms:** FFT algorithms, applications of FFT algorithm. **Digital Filters:** Design of FIR and IIR filters. **Adaptive filters:** Adaptive system, Kalman filters, RLS adaptive filters, the steepest-descent method, the LMS filters. **Application of DSP:** Speech processing, analysis and coding, Matlab application to DSP.

Books:

1. J. G. Prokis,Digital Signal Processing, *Prentice-hall Of India*
2. Defatta,Understanding Digital Signal Processing, *Orling Kindersley India*
3. R. G. Lyon,Digital Signal Processing, *Wiley India Pvt Ltd*
4. P. R. Babu.,Digital Signal Processing, *Scitech Publication*

CSE 4706: Simulation and Modeling

Simulation methods and model building: Introduction to simulation Packages. Random number generation. Random variate generation.
Queuing systems: Characteristics of queuing system, Steady state behavior infinite population Monrovians models (M/M/1/N, M/M/C/C, M/M/, Stages-Erlang, M/E/1, E/M/1, bulk arrival and service systems), Steady state behavior of finite population models (M/M/1/M, M/M//M, M/M/C/K/M, M/M/C/K/K). Input modeling. Validation and verification of simulation models. Output analysis for simulation models.

Books:

1. Jerry Banks, John S. Carson, Barry L. Nelson, David M. Nicol, Discrete Event System Simulation.
2. Geoffrey Gordon, System Simulation.
3. Averill M. Law, W. David Kelton, Simulation Modeling and Analysis.
4. Narsingh Deo, System Simulation with Digital Computer.

CSE 4707: Computer Graphics & Animation

Graphics: Standard Graphics Primitives, Graphical user Interface; Graphics hardware; Coordinate conventions; Raster Scan Graphics Antialiasing; Polygons; Windowing and Clipping; Transformations; parallel and perspective, isometric projection; Segments with their applications. Three Dimensional Viewing and representation; Hidden Lines and Surface removal; Painters' algorithm, Z-Buffering; Rendering: Light Models, shading Interpolation Techniques; Introduction to graphics Programming. Concept of multimedia; Multimedia applications; Multimedia hardware; Digital audio; CD-ROM;
Animation: Art of Computer Animation, Computer Animation Overview, Manual Methods for Motion Creation, Cinematography and Filmmaking, Rotations and Parameterizations

Books:

1. Zhigang Xian, Roy A. Plastock, Schaum's Outline of Computer Graphics.
2. Angel, Interactive Computer Graphics: A Top-Down Approach Using Open GL.
3. Xiuzhen Cheng and dechang Chen, Pattern Recognition and String Matching.
4. William Givson, Pattern Recognition.
5. Computer Animation and Video Games. By Alberto Menache.

CSE 4708L: Computer Graphics & Animation Lab

Laboratory works based on CSE4707

YEAR-4, SEMESTER -8

CSE 4801: Artificial Intelligence & Expert System

Survey of basic Artificial Intelligence concept and controversies.
Knowledge representation: First order predicate logic and rule-based representation, inconsistencies and uncertainties, structured representation.
Knowledge organization and manipulation: Search and control strategies, game playing, planning, decision making.
Perception and communication: Languages (LISP and PROLOG), basic problem solving techniques, knowledge representation and computer inference, natural language understanding and processing, visual image understanding, machine learning, computer vision, robotics.

Books:

1. Stuart J. Russel and Peter Norving, Artificial Intelligence -- A Modern Approach.
2. Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems.
3. M. Tim Jones, Artificial Intelligence Application Programming.
4. Ian Bratko, PROLOG: Programming for Artificial Intelligence.

CSE 4802L: Artificial Intelligence & Expert System Lab

Laboratory works based on 4801

CSE 4803: Technical Writing & Presentation

Issues of technical writing and effective oral presentation in computer science & engineering; Writing styles of definitions, propositions, theorems and proofs;
Preparing of reports, research papers, theses and books: abstract, preface, contents, bibliography and index;
Writing of book reviews and referee reports;
Writing tools: LATEX; Diagram drawing software; Presentation tools;

Books:

1. Leo Finkestain, Pocket book of technical writing for Engineers & Scientists,
    a. McGraw. Hill, 2004.
2. Heather SSilyn-Roberts, Writing for science & Engineering; Papers, Presentation
    a. & Reports, 2002.
3. Darlene smith-Worthington and Sue Jefferson, Technical writing for success.2004

CSE 4804: Data ware-housing & Data Mining

Introduction: Models, methodologies, and processes. The KDD process. Generic tasks, Application, Example: weather data Data
Warehouse and OLAP: Data Warehouse and DBMS, Multidimensional data model, OLAP operations, Example: loan data set
Data preprocessing: Data cleaning, Data transformation, Data reduction, Discretization and generating concept hierarchies, Experiments with Weka - filters, discretization
Data mining knowledge representation: Task relevant data, Background knowledge, Interestingness measures, Representing input data and output knowledge, Visualization techniques, Experiments with Weka - visualization
Attribute-Value Learning Techniques: Attribute generalization, Attribute relevance, Decision trees. Decision lists. Classification and regression trees. Association rules. Correlations. Rule-based mining. The prediction task, Statistical (Bayesian) classification, Instance-based methods (nearest neighbor), Linear models, Experiments with Weka - using filters and statistics,- mining association rules, decision trees, prediction.
Evaluating what's been learned: Training and testing, Estimating classifier accuracy (holdout, cross-validation, leave-one-out), Combining multiple models (bagging, boosting, stacking), Experiments with Weka - training and testing.
Clustering: Basic issues in clustering, First conceptual clustering system: Cluster/2, Partitioning methods: k-means, expectation maximization (EM), Hierarchical methods: distance-based agglomerative and divisible clustering, Conceptual clustering: Cobweb, Experiments with Weka - k-means, EM, Cobweb.

Books:

1. J. Han and M. Kamber, Concepts and Techniques, *Morgan Kaufmann Publishers*.
2. Ian H. Witten and Eibe Frank, Data Mining, Practical Machine Learning Tools and Techniques, *Morgan Kaufmann*
3. Tan, Steinbach, Kumar, Introduction to Data Mining, *Addison-Wesley*
4. David L. Olson and Dursun Delen, Advancesd Data Mining and Techniques, *Springer*
5. Maimon, O. and Last, M., Knowledge Discovery and Data Mining - The Info-Fuzzy Network (IFN) Methodology, *Kluwer Academic Publishers, Massive Computing Series*
6. Mitchell, T.M Machine Learning, *McGraw-Hill*.

CSE 4805: IT Entrepreneurship

IT Entrepreneur:

What is IT product & service; Classification of IT product & service; What do you mean by IT Entrepreneur? Evolution of the concept of IT entrepreneur/ who is entrepreneur? Characteristics/traits an entrepreneur; Discuss the qualities of a successful entrepreneur; Functions of entrepreneur; Discuss t types/classification of entrepreneur; What do you mean by IT Entrepreneur? Write down the causes success and failure of entrepreneur.

IT Entrepreneurship:

What do you mean by IT Entrepreneurship? Concept of IT Entrepreneurship; Discuss the relationship between entrepreneur and entrepreneurship; Role/Importance/Significant of IT entrepreneur or entrepreneurship in the economic development; Step/Stage/Process of IT entrepreneurship developme Factors affecting IT entrepreneurship growth.

IT Entrepreneurial Motivation:

What is an IT Entrepreneurial motivation? Theory of motivation; Motivating factors of emerging entrepreneurship.

Rural IT Entrepreneurship:

Meaning of rural entrepreneurship; Need for rural entrepreneurship; Problems of rural entrepreneurship How to develop rural entrepreneurship; Role of NGOs in the rural entrepreneurship development.

Business Planning for IT Entrepreneurship:

Definition of business planning for IT entrepreneurship; Benefits/importance/objectives of business planning for IT products & services; How to develop marketing/business plan or what guidelines shou follow for developing a business plan; Steps/process of Business planning; Subject matters/scope/field/ stages Business planning.

IT Entrepreneurship development program:

Concept of IT entrepreneurship development program; Objectives of IT entrepreneurship developme program rs (EDPs); Government policy for IT Entrepreneurship development program (EDPs).

IT Entrepreneurship development in Bangladesh:

Problems of IT entrepreneurship development in Bangladesh; Suggestion for removing problem of entrepreneurship development of Bangladesh; Opportunity/Prospects of IT entrepreneur development Bangladesh; Institutional/Organization sources of assistance of IT entrepreneur development Bangladesh

Books:

1. Moore, Geoffrey: Crossing the Chasm
2. Aulet, Bill: Disciplined Entrepreneurship: 24 Steps to a Successful Startup, Wiley 2013
3. Proposed “light” reading: Bojár, Gabor: The Graphisoft Story, Hungarian Perestroika from an Entrepreneur’s Perspective, Translated from Graphi-sztori, HVG, 2005.
4. Dollinger Marc J, Entrepreneurship: Strategies and Resources, III Ed., 1995, Irwin Press
5. Hisrich Robert D and Peters Michael P, Entrepreneurship, V Ed., TMH New Delhi