SCHEME AND SYLLABUS AND DISTRIBUTION OF MARKS

Semester 1

Course code	Credits	Course Name	CE	ESE	Total
EN1111.4	2	Speaking and listening skills	20	80	100
MM1131.10	3	Mathematics I	20	80	100
CS1121	2	Introduction to IT	20	80	100
CS1131	3	Digital Electronics	20	80	100
CS1141	4	Introduction to Programming	20	80	100
CS1142	3	Programming Lab – I	20	80	100
CS1132	3	Digital Electronics Lab	20	80	100
TOTAL	**20**		**140**	**560**	**700**

Semester 2

Course code	Credits	Course Name	CE	ESE	Total
EN1211.4	2	Writing and Presentation Skills	20	80	100
MM1231.10	3	Mathematics II	20	80	100
CS1221	3	Environmental Studies	20	80	100
CS1241	3	Data Structures	20	80	100
CS1242	3	Object Oriented Programming	20	80	100
CS1243	3	Programming Lab – II	20	80	100
CS1244	3	Data Structures Lab	20	80	100
TOTAL	**20**		**140**	**560**	**700**

Semester 3

Course code	Credits	Course Name	CE	ESE	Total
CS1341	2	Computer Organization & Architecture	20	80	100
CS1342	3	Software Engineering	20	80	100
CS1343	3	Operating Systems	20	80	100
CS1344	3	Internet Programming	20	80	100
CS1345	3	Microprocessors & Peripherals	20	80	100
CS1346	3	Programming Lab – III	20	80	100
CS1347	3	Internet Programming– Lab	20	80	100
TOTAL	**20**		**140**	**560**	**700**

Semester 4

Course code	Credits	Course Name	CE	ESE	Total
CS1441	3	Design And Analysis of Algorithms	20	80	100
CS1442	3	Database Management Systems	20	80	100
CS1443	3	Computer Networks	20	80	100
CS1444	3	Programming in Java	20	80	100
CS1445	2	Minor Project		100	100
CS1446	3	Programming Lab – IV	20	80	100
CS1447	3	Databases Lab	20	80	100
TOTAL	20		120	580	700

Semester 5

Course code	Credits	Course Name	CE	ESE	Total
CS1541	3	Free and Open Source Softwares (Foss)	20	80	100
CS1542	3	System Software	20	80	100
CS1543	3	Computer Graphics	20	80	100
CS1551.1 CS1551.2 CS1551.3	2	**Open Course** Internet Technology Linux Environment Business Informatics	20	80	100
CS1561.1 CS1561.2 CS1561.3	3	**Elective** Multimedia Systems Bioinformatics Trends in Computing	20	80	100
CS1544	3	Computer Graphics Lab	20	80	100
CS1545	3	Free and Open Source Software (Foss) Lab	20	80	100
TOTAL	20		140	560	700

Semester 6

Course code	Credits	Course Name	CE	ESE	Total
CS1641	4	Introduction to Information Security	20	80	100
CS1642	4	Artificial Intelligence	20	80	100
CS1643	4	E-Commerce & E-Governance	20	80	100
CS1661.1 CS1661.2 CS1661.3	4	**Electives** Mobile Computing Embedded Systems Data Mining & Data Warehousing	20	80	100
CS1644	4	Major Project & Viva		100	100
TOTAL	20		80	420	500
GRAND TOTAL	120				4000

Division of Marks (Lab Examination)

(Computer Science)
1. First program should be sufficiently simple   **– 25 marks**
   (Logic – 10 marks, Successful compilation – 10 marks, Result – 5 marks)
2. Second program should be based on advanced concepts   **- 30 marks**
   (Logic – 15 marks, Successful compilation – 10 marks, result – 5 marks)
3. Viva Voce   **- 15 marks**
4. Lab Record   **- 10 marks**

                                        Total Marks   - 80 marks

(Digital Electronics)
1. Procedure- Theory/Connection Diagram/ Equation   **- 20 Marks**
2. Manipulation of Experiment- Connection/Soldering   **- 15 Marks**
3. Observation/Tabulation/Calculation   **- 10 Marks**
4. Viva   **- 10 Marks**
5. Result   **- 10 Marks**
6. Identification of Circuit Components   **- 15**
   Marks(Resistors Using Color Codes, Capacitors, Diodes, Transistors etc)

                                        Total Marks   - 80 Marks

SEMESTER ONE

EN1111.4 SPEAKING AND LISTENING SKILLS

Module I: Pronunciation
Phonemic symbols – consonants – vowels –syllables - word stress - strong and weak forming notation.

Module II: **Listening Skills**
Difference between listening and hearing –active listening –barriers to listening -academic listening - listening for details - listening and note-taking - listening for sound contents of videos- listening to talks and descriptions -listening for meaning - listening to announcements - listening to news programmes.

Module III: **Speaking Skills**
Interactive nature of communication -importance of context - formal and informal – set Expressions in different situations –greeting – introducing - making requests - asking for /giving permission - giving instructions and directions – agreeing / disagreeing - seeking and giving advice - inviting and apologizing telephonic skills - conversational manners

Module IV: **Dialogue Practice**

(Students should be given ample practice in dialogue, using core and supplementary materials)

REFERENCES
 Core
   ❖ *Listening and Speaking: A Course for Undergraduate Students* (Foundation Books)
 Additional
   ▪ Marks, Jonathan, *English Pronunciation in Use*. New Delhi: CUP, 2007.
   ▪ Lynch, Tony. *Study Listening*, New Delhi: CUP, 2008.
   ▪ Kenneth, Anderson, Tony Lynch, Joan MacLean, *Study Speaking*. New Delhi: CUP, 2008

MM1131.10 MATHEMATICS I

Module–I: Review of basic differentiation, Differentiation of hyperbolic functions, derivatives ofhyperbolic functions, inverse hyperbolic functions logarithmic differentiation, implicitdifferentiation, Lebnitz's theorem, Mean value theorem, Rolle's theorem, Lagrange's mean-valuetheorem, Maxima and minima.

Module–II: Differential equations, General Concepts, Formulation and solution of differentialequations, solution of higher order linear Des, partial Des**,** Laplace and Inverse Laplace transforms

Module–III: Theory of Numbers, prime numbers, Unique factorization theorem, Euclideanalgorithm, congruences, Fermat's theorem, Wilson's theorem

Module–IV: Complex Numbers, Separation into real and imaginary parts, Complex mapping

 REFERENCES

Core
   ❖ Erwin Kreyzig,*Advanced Engineering Mathematics*, New Age International Pvt Ltd.
   ❖ Shanthi Narayan, *Differential Calculus*, S Chand & Company
   ❖ ZafarAhsan, *Differential Equations and their applications*.
   ❖ RudraPratap, *Getting Started with MATLAB*, Oxford University Press

 Internet resources:
   o www.ams.org/mathweb
   o www.falstad.com/mathphysics.html

ACTIVITIES AND ASSIGNMENTS:*Markov processes. Harmonic analysis and Fourier series, Linear Programming*

CS1121 INTRODUCTION TO IT

Module–I:Computer characteristics: Speed, storage, accuracy, diligence; Digital signals, BinarySystem, ASCII; Historic Evolution of Computers; Classification of computers: Microcomputer,Minicomputer, mainframes, Supercomputers; Personal computers: Desktop, Laptops, Palmtop,Tablet PC; Hardware & Software; Von Neumann model.

Module–II:Hardware: CPU, Memory, Input devices, output devices. Memory units: RAM(SDRAM, DDR RAM, RDRAM etc. feature wise comparison only); ROM-different types: Flashmemory; Auxiliary storage: Magnetic devices, Optical Devices; Floppy, Hard disk, Memory stick,CD, DVD, CD-Writer; Input devices - keyboard, mouse, scanner, speech input devices, digitalcamera, Touch screen, Joystick, Optical readers, bar code reader; Output devices: Display device,size and resolution; CRT, LCD; Printers: Dot-matrix, Inkjet, Laser; Plotters, Sound cards & speaker.

Module-III:Software- System software, Application software; concepts of files and folders,Introduction to Operating systems, Different types of operating systems: single user, multitasking,time-sharing multi-user; Booting, POST; Basic features of two GUI operating systems: Windows &Linux (Basic desk top management); Programming Languages, Compiler, Interpreter, Databases;Application softwares: Generic Features of Word processors, Spreadsheets and Presentationsoftwares; Generic Introduction to Latex for scientific typesetting; Utilities and their use; ComputerViruses & Protection, Free software, open source.

Module–IV:Computer Networks- Connecting computers, Requirements for a network: Server,Workstation, switch, router, network operating systems; Internet: brief history, World Wide Web,Websites, URL, browsers, search engines, search tips; Internet connections: ISP, Dial-up, cablemodem, WLL, DSL, leased line; email, email software features (send receive, filter, attach, forward,copy, blind copy); characteristics of web-based systems, Web pages, introduction to HTML.

Core
  ❖ E.Balaguruswamy, *Fundamentals of Computers*, McGraw hill, 2014
Additional
  ▪ Dennis P Curtain, *Information Technology: The Breaking wave*, McGrawhill, 2014
  ▪ Peter Norton, *Introduction to Computers*, McGrawhill, Seventh edition
Internet resources:
  o www.fgcu.edu/support/office2000
  o www.openoffice.org *Open Office Official website*
  o www.microsoft.com/office *MS Office web site*
  o www.lgta.org *Office on-line lessons*
  o www.learnthenet.com *Web Primer*
  o www.computer.org/history/timeline
  o www.computerhistory.org

- o http://computer.howstuffworks.com
- o http://vmoc.museophile.org *Computer History*
- o www.dell.com *Dell Computers*
- o www.intel.com *Intel*
- o www.ibm.com *IBM*
- o www.keralaitmission.org *Kerala Govt. IT Dept*.
- o www.technopark.org

ACTIVITIES & ASSIGNMENTS:*Applications of Computers in various fields: office automation, education, entertainment, medicine, commerce, governance, resource management, law and order, communications, science and technology, defense; Historic evolution of IT; Pioneers in IT; Debates in IT : Computer Creativity, Digital Divide, IT Policy, IT and Development etc; IT in India (major initiatives, key institutions, statistics), IT in Kerala (major initiatives, key institutions, statistics); Careers in IT.*

CS1131 DIGITAL ELECTRONICS

Module–I:Review of Basic Electronics: Review of basic operations of passive and active electroniccomponents: Resistors, Capacitors, Inductors, Diodes, LEDs and Transistors, Operation of rectifiers(half and full wave), RC Coupled Feedback Amplifiers, Oscillators, Multi-vibrators, 555 timer (Allthe preceding topics shall be covered with stress on behaviour of component/circuit).

Module–II:Data Representation: Data Representation: Concept of number system bases – binary, decimal and hexadecimal number systems and conversion between each, Binary arithmetic: Addition, subtraction, 1s and 2s complement system, multiplication, Codes: BCD, ASCII, FloatingPoint Representation.

Module III:Boolean Algebra: Basic Functions: AND, OR and NOT, Truth tables; Combinational logic: Laws of Boolean Algebra; Combinational Logic in Venn diagrams; Other Boolean functions: NAND, NOR, XOR, Implication; Flip Flops and Latches; Realising Boolean Functions: Min-terms, SOP Expressions, Max-terms, POS Expressions; Karnaugh maps, McClarley method.

Module IV:Digital Circuits: Multiplexer, Adders (full and half), comparators, counters, Decodersand display, shift registers, de-multiplexer and key-board encoder; Digital ICs: TTL, CMOS and ECL families, SSI, MSI, LSI and VLSI classification, noise, fan-out, power dissipation, propagation delay.

REFERENCES
Core
 ❖ M.Morris Mano, *Digital Logic and Computer Design*, Pearson, 2013
Additional
 ▪ Thomas L Floyd, *Digital fundamentals*, Pearson, 2013
Internet resources:
 o www.prenhall.com/mano

ACTIVITIES AND ASSIGNMENTS: *Miscellaneous Topics: Advances in Electronics: Evolution of Transistor Technology, Nano Technology, Molecular Electronics.*

CS1141 INTRODUCTION TO PROGRAMMING

Module–I: Introduction to programming: Algorithm & Flow charts: Definitions, Symbols used todraw flowcharts, Examples, Editor, Program Writing – Structure of the Program, top-down design, Source code, Object code, Executable file, Extensions of different files, Program Compilation, Running of aProgram; Header file concept.Variables and Constants, Rules for naming the Variables/Identifiers;Basic data types of C, int, char, float, double; storage capacity – range of all the data types; Storageclasses;

Module-II: Basic Elements: Operators and Expressions: Assignment Operator, Arithmetic Operator and Arithmetic expression, Relational Operator and Relational exp., Logical Operator and how it is used in condition,Expression Evaluation (Precedence of Operators); simple I/O statements, Control structures, if, if else, switch-case, for, while, do-while, break, continue.Arrays, Defining simple arrays, Multi-dimensional arrays, declaration, initialization andprocessing;

Module-III: Functions & Pointers: concept of modular programming, Library, User defined functions, declaration, definition & scope, recursion, Pointers: The & and * Operators, pointer declaration, assignment and arithmetic, visualizing pointers, call by value, call by reference, dynamic memory allocation.

Module–IV: Advanced features: Array & pointer relationship, pointer to arrays, array of pointers. Strings: Stringhandling functions; Structures and unions; File handling: text and binary files, file operations,Library functions for file handling,Modes of files.

REFERENCES
Core
❖ Ashok N. Kamthene, *Programming in C*, Pearson Education, Second edition
Additional
▪ E.Balaguruswamy, *Programming in ANSI C*, McGrawhill, Sixth Edition

ACTIVITIES AND ASSIGNMENTS: *Pre-processor directives: #include, #define, macros with arguments, the operators# and ##, conditional compilations, multiple file programming; creating header files, program verification, algorithm efficiency analysis; int86 functions and graphic functions.*

CS1142 PROGRAMMING LAB – I

1. Familiarization of important DOS/Windows/Linux features
2. Practice on basic features of word processor, spread sheet and presentation software.

Part A

The C laboratory work will consist of 15-20 Experiments

1. Testing out and interpreting a variety of simple programs to demonstrate the syntax and use of the following features of the language: basic data types, operators and control structures.

Part II

2. 1-D Arrays: A variety of programs to declare, intitialise, read, print and process 1-D arrays of various basic data types. Processing to include, selection, sum, counting, selective sum, selective counting, reversing etc.

3. Pointers: A large number of trivial programs involving all possible data types to familiarize the syntax of pointers in a variety of situations and to draw memory diagrams based on the observations.

4. Structures: A variety of programs to declare, intitialise, read, print and process structures madeup of a variety of data types and structures.

5. 2-D Arrays: A variety of programs to declare, intitialise, read, print and process 2-D arrays ofvarious basic data types. Processing to include, selection, sum, counting, selective sum, selective counting, reversing etc.

6. Array of Structures and Structure of Arrays: Programs to demonstrate declaration and processing of structure of arrays and array of structures.

7. Pointers to Arrays: A number of programs to demonstrate handling of 1-D and 2-D arraysusing pointers and to draw memory diagrams based on the observations.

8. Pointers to Structures: A number of programs to demonstrate use of pointers to structures andto draw memory diagrams based on the observations.

9. Functions –I: Simple Examples of declaring and using functions of the following categories (i)no argument, no return, (ii) argument, no return, (iii) no argument, return, (iv) argument,return, all pass by value

10. Functions –II: Declaring and using functions with pass by reference, Passing and Returningstructures, Recursive functions.

11. Files: Simple Example involving use of multiple files: declaring, opening, closing, reading from and writing to text files.

12. Files: Example involving use of multiple files: declaring, opening, closing, reading from and writing to binary files.

13. Library functions: A variety of Examples demonstrating (i) string processing functions (ii) a variety of selected library functions

14. Debugging programs involving syntactic and/or logical errors

16-20: Developing programming solutions to problems including program design, algorithm development and data structure selection.

REFERENCES

Core

❖ Deitel&Deital, *C: How to Program*, Pearson Education
❖ Alan R Feuer, *The C Puzzle Book*, Pearson Education
❖ YashvantKanetkar, *Test Your C Skills*, BPB Publications, 3rd Edition

Internet resources:

o www.cprogramming.com

- o www.programmersheaven.com
- o comp.lang.c*newsgroup*
- o www.cplusplus.com
- o //cwx.prenhall.com/bookbind/pubbooks/deitel
- o www.fgcu.edu/support/office2000
- o www.openoffice.org Open Office Official web site
- o www.microsoft.com/office MS Office web site
- o www.lgta.org Office on-line lessons
- o www.learnthenet.com Web Primer

CS1132 DIGITAL ELECTRONICS LAB

The laboratory work will consist of 15 experiments

1. Study and Testing of measuring instruments: Digital and Analog multi-meters, CROs and Signal Generators
   a. measurement of AC & DC voltages, measurement of frequency.
2. Study of Components: Identification and testing of resistors, capacitors, inductors, diodes, LEDs &transistors
3. Diode characteristics and half-wave rectification
4. Full wave rectifier
5. R-C coupled CE Amplifier
6. Familiarisation of Components and Gates: Identify and test passive and active components, find noisemargin and fan-in/out of TTL gates
7. Study of Logic Gates: Determination truth table of basic gates, realization of Boolean functions, test pulseoperation
8. Realisation of given truth table with minimum number of gates
9. Implementation of a 3x8 decoder, BCD to 7-segment decoder
10. Generating a Boolean expression with a multiplexer
11. 4-line to 16 bit decoder; Key board encoder/decoder
12. 8-bit comparator
13. Clocked JK Flip Flop
14. 8-bit ripple counter
15. Parallel-in, serial-out, 4-bit shift register

References:
Core
- ❖ K A Krishnamoorthy, *Digital Lab Primer*, Pearson Education

Additional
- ▪ K. A. Navas, *Electronics lab manual Vol. I, (3rd Edition)*, Rajath Publishers

Internet Resources:
- o http://www.electronics-lab.com

SEMESTER TWO

EN1211.4 WRITING AND PRESENTATION SKILLS

Module I: Writing as a skill – its importance - mechanism of writing – words and sentences - paragraph as a unit of structuring a whole text - combining different sources – functional use of writing –personal, academic and business writing – creative use of writing.

Module II: Writing process - planning a text - finding materials - drafting – revising – editing - finalizing the draft - computer as an aid - key board skills - word processing - desk top publishing

Module III: Writing models – essay - précis - expansion of ideas – dialogue - letter writing - personal letters - formal letters - CV – surveys – questionnaire - e-mail – fax - job application - report writing.

Module IV: Presentation as a skill - elements of presentation strategies – audience – objectives medium- key ideas - structuring the material - organizing content - audio-visual aids - hand-outs - use of power point - clarity of presentation - non-verbal communication -seminar paper presentation and discussion.

REFERENCES
 Core
   ❖ **Module I to III:***Write Rightly* A Course for *Sharpening Your Writing Skills. (CUP)*
   ❖ **Module IV**: *Guide to Presentations,* Mary Munter and Lynn Rusell, Pearson Education
Additional
   ▪ **Part I to III**
     • Robert, Barraas,*Students Must Write*, London: Routledge, 2006.
     • Bailey, Stephen,*Academic Writing,*Routledge, 2006.
     • Hamp-Lyons and etal. *Study Writing,* 2nd Edition.Cambridge University Press, 2008.
     • Ilona, Leki,*Academic Writing*, CUP, 1998.
     • McCarter, Sam, Norman Whitby,*Writing Skills,* Macmillan India, 2009.
   ▪ **Module IV:** Jay. *Effective Presentation*. New Delhi: Pearson, 2009.
   ▪ Mayor, Michael, et al, Ed. *Longman Dictionary OfContemporary English.* 5th Edition. London: PearsonLongman Ltd, 2009

MM1231.10 MATHEMATICS II

Module–I: Proof Methods, Logic: Formal proofs, Propositional reasoning, Proofs by contradiction, False Proofs, Proofs by Induction, Symbolic Logic: Boolean expressions, Logical Equivalance, DeMorgan's Law, tautologies, Implications, Arguments, Fallacies, Normal forms in prepositional logic, Resolution

Module–II: Set Theory, Relations, Functions: Review of Set theory concepts, set operations, characteristic functions, fuzzy set theory basics, Relations: operations on relations, equivalence relations & partitions, partial orders, ordered sets, Warshal's algorithm, Functions, Recursion,

Module–III: Algebraic Structures: Algebra, DeMorgan's Law, Group, Ring, Polish expressions, Communication Model and error corrections, Hamming Codes

Module–IV: Graph Theory: Introduction, Graph Notation, Topological sort, GraphPropagation algorithm, Depth First, Breadth-first searches, Shortest Path algorithms, Directedacyclic graphs

REFERENCES
Core
- ❖ V. Ramaswamy, *Discrete Mathematical Structures with Applications to Combinatorics*, Universities press
- ❖ RajendraAkerkar, RupaliAkerkar, *Discrete Mathematics*, Pearson Education

Additional
- ▪ R MSomasundaram, *Discrete Mathematical structures*
- ▪ Calvin C. Clawson, *Mathematical Mysteries, The beauty and magic of Numbers*, Viva BooksPvt Ltd
- ▪ RudraPratap, *Getting Started with MATLAB*, Oxford University Press

ACTIVITIES AND ASSIGNMENTS:*Graphical representations of functions, Graphical interpretation of convergence, Complex Mapping, Fractals, Grammars, Languages and Automaton. Introduction to Matlab (Matrix, Linear Algebra, Graphics operations)*

CS1221 Environmental Studies

Module1: The multidisciplinary nature of environmental studies: definition, scope and importance, natural resources: renewable and non-renewable resources, role of an individual in conservation of natural resources, equitable use of resources for sustainable lifestyles.

Module II: Ecosystems: concepts, structure and functions of an ecosystem, producers, consumers and decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids, introduction, types, characteristic features, structure and functions. Biodiversity and its conservation: introduction – definition: genetic, species, ecosystem diversity, biogeographic classification of India, value of biodiversity: consumptive, productive use, social, ethical, Aesthetic and option values, biodiversity at global, national and local levels, India as a mega diversity nation, hotspots of biodiversity, threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, endangered and endemic species of India.

Module III: Environmental pollution: causes, effects and control measures, solid waste management: causes, effects and control measures of urban and industrial waste, role of individuals in pollution prevention.

Module IV: Social issues and the environment: from unsustainable to sustainable development, urban problems related to energy, water conservation, rain water harvesting, watershed, Management, environmental ethics: issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, Nuclear accidents and nuclear holocaust, wasteland reclamation, Human population and the environment: population growth, variation among nations, population explosion – family welfare program, environmental and human health, human rights, value education, hiv/aids, women and child welfare.

References:
1. Agarwal KC, 2001. Environmental Biology, Nidi Publishers Ltd. Bikaner.
2. BharuchaErach, 2003. The Biodiversity of India, Mapin Publishing Pvt. Ltd, India.
3. Brunner RC, 1989, Hazardous Waste Incineration, McGraw Hill Inc.

CS1241 DATA STRUCTURES

Module–I: Review of Arrays, Structures, pointer to structures, passing structures as arguments to functions. Linked Lists: Concept of static versus dynamic data structures, implementation of linked lists using pointers, operations on linked lists: insertion, deletion and traversing.Doubly linked lists and circular linked lists, applications of linked lists.

Module- II: Stacks and Queues:FIFO and LIFO data structures – stacks using (i) pointers and (ii) arrays. Queues using (i) pointers and (ii) arrays, applications, polish notation.

Module-III: Trees: Concept of linear versus non-linear data structures, various types of trees – binary, binary search trees. Creating a binary search tree, traversing a binary tree (in-order, pre-order and post-order), operations on a tree –insertion, deletion and processing, expression trees,implementation using pointers, applications.

Module–IV: Searching: sequential searching, binary searching, Hashing – linear hashing, hash functions, hash table searching, Sorting: exchange sort, selection sort and insertion sort,Graphs, graph traversal- depth-first and breadth-first traversal of graphs, applications.

REFERENCES
Core
 ❖ A.K.Sharma, *Data Structures Using C*, Pearson, Second edition, 2011
Additional
 ▪ Nair A.S., Makhalekshmi,*Data Structures in C*, PHI, Third edition 2011.
Internet resources:
 o www.keralauniversity.edu/csbos
 o http://warrior-101.tripod.com/dstut/dstut.html: Tutorial on data structures.
 o http://crasseux.com/books/ctutorial/Data-structures.html

ACTIVITIES AND ASSIGNMENTS:*Multi-way search trees, B-trees, Huffman trees, case studies.*

CS1242 OBJECT ORIENTED PROGRAMMING
 SYLLABUS

Module–I: Concept of Object orientation – why related data and methods should be kept as a single unit – comparison with procedural and structured programming – Classes and objects – data abstraction, encapsulation, inheritance, polymorphism, dynamic binding, messagepassing. Advantages of object orientation – reusability, maintenance, security, comfort inprogramming. Input and output streams in C++; Basic data types and declarations.

Module–II: Classes and objects in C++, access modifiers, static members, friend functions, Constructors and Destructors, polymorphism, Operator Overloading and type conversion, anonymous objects

Module-III: Inheritance- parent and child classes, private, public and protected inheritance, Multiple inheritance and multi-level inheritance, Virtual base classes. C++ and memory models – new and delete operators, Heap, dynamic objects.

Module–IV: Binding & Polymorphism: Early binding, Late Binding, Pointers to derived class objects, virtual functions, Pure virtual functions, abstract classes, object slicing, exception handling in C++: try, throw and catch.

REFERENCES
 Core
  ❖ Ashok N. Kamthane, *Object oriented Programming with ANSI & Turbo C++,* Pearson

Additional
  ▪ H M Deitel and P J Deitel, *C++: how to program*, Pearson Education
  ▪ Robert Lafore, *Object Oriented Programming in Turbo C++*, Galgotia Publications

 ACTIVITIES AND ASSIGNMENTS: *Evolution of OOP – history of C and C++, Review of features of C++ common with C and also minor variations; study of File stream classes in C++. Templates – class and function templates, Templates versus macros, String objects in C++, Standard Template Library in C++ - containers, associative containers Name spaces.*

CS1243 PROGRAMMING LAB – II

The laboratory work will consist of 15-20 experiments, only by using class concept
Part A
1. Testing out and interpreting a variety of simple programs to demonstrate the syntax and use of the following features of the language: basic data types, operators and controlstructures.

2. Solving a problem using (i) structures and (ii) classes and comparison between the two(the problem logic and details should be kept minimal and simple to enable focus on thecontrast between the two methods, for example declaring result of a set of students definingthe name and total marks in the program itself).

3. Class definitions and usage involving variety of constructors and destructors

Part B

4. Programs involving various kinds of inheritances,

5. Programs involving operator overloading and type conversions

6. Programs involving virtual base classes, friend functions

7. Program to demonstrate early and late binding

8. Program to allocate memory dynamically

9. Program involving class and function templates

10. Programs to demonstrate(i) string processing (ii) file streams (iii) a variety of selectedlibrary functions

11. exception handling

12.Handling of 2-D arrays using pointers

13. Debugging programs involving syntactic and/or logical errors

REFERENCES

❖ Deitel&Deital, *C++: How to Program*, Pearson Education

CS1244 DATA STRUCTURES LAB

The laboratory work will consist of 15-20 experiments like

Part A

• Linked list: traversal, node deletion, node insertion in singly, doubly and circular lists

• Implementation of different searching techniques

• Implementation of different sorting techniques

Part B

• Stacks: matrix representation and linked list representation: Push, Pop

• Queues: matrix representation and linked list representation: Add, delete

• Circular queue implementation

• Evaluation of expression using stacks

• Tree traversal

• Evaluation of expression using binary trees.

• Infix to postfix and prefix conversion

• Creating and processing binary search tree

SEMESTER THREE

CS1341 COMPUTER ORGANIZATION & ARCHITECTURE

Module–I: Functional units of a PC; basic operational concepts; memory address, word, instruction set, programs, assembly language instructions; CPU registers; addressing modes, instruction format, system buses, instruction cycle, memory, example-organization of 8085 computer; encoding of information, unsigned numbers, signed numbers, operations, Booth's algorithm (circuit design and RTL not required), floating point number representation, operations.

Module–II: Processing unit: Specifying a CPU, design of a simple CPU, fetchinginstructions, decoding and executing instructions, branching, design of a simple ALU, designof control unit, multiple buses in CPU, Micro-program, micro sequencer, micro subroutine,microinstruction format, design and implementation of a simple micro-sequencer; micro-programmed control and hardwired control, RISC & CISC (feature-wise comparisononly); Pipelining and Parallel processing**,** Pentium microprocessor.

Module–III: Memory: memory hierarchy, speed, size, cost; RAM, ROM, internal chiporganization; cache memory, operations in cache memory, hit ratio, multilevel organization of cache memory; virtual memory, page fault, TLB, segmentation, memory protection,multiple module memories, memory interleaving.

Module–IV: Input Output operations: Accessing I/O devices; Asynchronous datatransfers, handshaking, programmed I/O (concept only), polling, interrupts: types ofinterrupts, processing interrupts, priority, interrupt hardware, ISR, daisy chaining; Directmemory access, DMA controller, transfer modes, I/O processors, serial communication,UART, standards: RS-232, USB.

REFERENCES

Core

❖ Carpinelli, John D., *Computer systems Organization & Architecture*, Pearson Education

Additional

- Carl Hamacher, Vranesic, Zaky, *Computer Organization* 4/e, McGraw-Hill
- ISRD Group, *Computer Organization*, McGrawhill, Tenth edition

ACTIVITIES AND ASSIGNMENTS: *parallelism in uniprocessor systems, organization of general-purpose multiprocessors; RTL, VHDL; hardware essentials: CPU sockets; FDC, HDC, I/O cards, display adapter, modem; motherboard architecture; bus system: PCI, AGP, USB; clustering, grid computing; Computer faults: hardware & software; types of faults; diagnostic programs and tools; printer problems; monitor problems, problem diagnosis, organization of a modern PC.*

CS1342 SOFTWARE ENGINEERING

Module 1: Introduction : Characteristics of Software, Product and Process, Need for Software Process, Characteristics of a Software Process, Software Development Process models, Software Development Life Cycle Model: Waterfall Model, Prototyping, iterative development, Spiral Model, time-boxing model; Comparison of different Life Cycle Models, Software Project Management, Project Estimation Techniques, Software Requirements Analysis and Definition:Software Requirements, Overview of SA/SD Methodology, Requirements Specification: Need forSRS, Characteristics of an SRS, Components of an SRS, Specification Languages, Structure of aRequirements document. Functional Specification with Use cases, developing use cases, Structured Analysis, Matrics, quality metrics, Planning a project, effort estimation, COCOMO model, quality plan, risk management-assessment, control.

Module II:Function oriented design: Problem partitioning, abstraction, modularity, Top-down and Bottom-up Strategies, coupling, cohesion, design notations-structure charts, structured design, Data Flow Diagrams, Developing the DFD Model of a system, Entity Relationship Diagram, Developing ERD of a system, Decision Trees, Decision Tables, Structured English, first-level factoring, factoring input, output and transform branches, transaction analysis, verification.

Module III:Object-oriented design: Object-oriented design concepts, Comparison between Algorithmic Decomposition and Object Oriented Decomposition Unified Modelling Language, Object Oriented Design using UML, Class Diagram, Sequence Diagram, Collaboration Diagram; detailed design, PDL, algorithm design, state modelling of classes, design walkthroughs, critical design review, consistency checkers, other UML diagrams.

Module IV: Coding and testing: common coding errors, structured programming, coding standards, incremental coding process, test driven development, source code control and build, refactoring, verification- code inspections, static analysis, unit testing, combining different techniques. Testing- error, fault and failure, test oracles, test cases, Black Box Testing, Equivalence Class Partitioning, Boundary Value Analysis, Cause Effect Graphing, White Box Testing- controlflowbased and data-flow based testing, test plan, test case specifications, defect logging andtracking, Comparison of Different Techniques.

REFERENCES:
Core

❖ Rajib Mall, *Fundamentals of Software Engineering,* Second Edition, PHI

Additional
- PankajJalote**,** *An Integrated Approach to Software Engineering***,** Narosa
- Waman S Jawadekar, *Software Engineering*, McGraw hill, 2013
- ***Journals and Magazines:*** (*i*) Software Development, CMP Media. (ii) Software QualityProfessional, ASQ.

Internet Resources:
- o http://courses.cs.vt.edu/csonline/SE/Lessons/
- o http://www.omg.org/gettingstarted/what_is_uml.htm
- o http://www-106.ibm.com/developerworks/java/library/co-design5.html
- o http://www-106.ibm.com/developerworks/java/library/j-jmod0508/
- o www.rspa.com
- o http://www.math-cs.gordon.edu/local/courses/cs211/ATM

ACTIVITIES AND ASSIGNMENTS: *Preparing various documents, case studies, preparing test plans, UMLdiagrams, Metrics for various development phases, Agile Programming Methodologies, extremeProgramming, Formal Methods, CASE Tools.*

CS1343 OPERATING SYSTEMS

Module I:Introduction to operating system: Operating system as the main component of system software; OS as a resource manager, Structureof OS- shell, utilities, resource management routines, kernel, evolution of OS, multi-programming,time sharing, real-time systems, parallel systems, distributed systems, OS functions, Characteristicsof modern OS; **Process Management:** Process description and control: process control block, Processstates: operations on processes; concurrent process; threads; processes and threads; symmetricmultiprocessing; micro Kernels. CPU Scheduling: Schedulers, Scheduling methodology, CPUScheduling algorithms, performance comparison.

Module II: Process synchronization- independent and concurrent processes, critical section, mutual Exclusion,Petersons solution, semaphore, classical synchronization problem-bounded buffer andreader/writer problem. Concept of inter-process communication.**Deadlock**- deadlock and starvation, conditions for deadlock,resource allocation problem, methodsfor handling deadlock-deadlock prevention, deadlock avoidance- Bankers algorithm, deadlockdetection, deadlock recovery.

Module III:Memory Management & Protection: Concept of memory, address binding, Logical address, physical address, swapping, contiguous allocation- fixed partition, variable partition, fragmentation. Non-contiguous allocation– paging, segmentation. Virtual memory-demand paging,pagefault, replacement algorithms, thrashing. Protection and security – mechanisms and policies, threats,accidental data loss, protection mechanisms, user authentication, attacks from inside,virus,antivirus.

Module IV:I/O & File Management I/O management – I/O hardware, application I/O interface,kernel I/O subsystem. Disk I/O, disk scheduling, RAID, disk cache. File management-file concept, access methods, directory structure, file system structure &implementation, directory implementation, allocation methods, free space management.

REFERENCES
Core
- ❖ Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, *Operating System Principles*

Additional
- Achyut S Godbole, *Operating systems*, McGRawhill, Third Edition

Internet resources:
- www.aw.com/cs_supplements/nutt3/index.html
- www.aw.com/cs_supplements/nutt/index.html
- //cwx.prenhall.com/bookbind/pubbooks/tanenbaum2/
- www.gnu.org, www.linux.org, www.linuxcentral.com

ACTIVITIES AND ASSIGNMENTS:*case study of popular Operating Systems- MS DOS, UNIX, Windows 2000,Windows NT, Linux, Sun OS, Solaris. Process management –Windows, Linux, Solaris.Concurrency management - Windows, Linux, Solaris.Memory management - Windows, Linux, Solaris.*

CS1344 INTERNET PROGRAMMING

Module–I: HTML: General Introduction to Internet and WWW; Text tags; Graphics, Video and Sound Tags; Link and Anchor Tags; Table Tags; Frame Tags; Miscellaneous tags (layers, image maps etc); CSS; DHTML; Example Applications; simple introduction to XML and VRML

Module–II: CGI Programming: HTML Forms and Fields; Perl: Basic control structures, data types and basic features; CGI Programs: GET & POST methods, simple applications; Cookies; Server SideIncludes; Example Applications;

Module–III:Javascript: Basic data types; control structures; standard functions; arrays and objects, event driven programming in Javascript; Example Applications;

Module–IV: Architecture of java Servelets; Servelet Structure; Servelet Life Cycle; Request and Response Objects; Sessions; Invoking Servelets;

REFERENCES

Core
- ❖ V.K. Jain, *Advanced Programming in Web Design*, Cyber Tech Publications

Additional
- Joel Sklar, *Principles of Web Design*, Vikas
- H M Deitel, P J Deitel& A B Goldberg, *Internet and Worldwide web programming: How toProgram*, 3/e, Pearson Education

Internet resources:
- ww.learnasp.com/learnasp/
- http://notes.corewebprogramming.com/
- www.rh.edu/~heidic/webtech/notes/
- www.redbrick.dcu.ie/help/slides/week7_perl/perl.ppt.

ACTIVITIES AND ASSIGNMENTS: *JDBC; PHP; .NET Technology; C#; Creative Design of Web sites; Macromedia flash, Web Servers, Web databases, Web Administration and Maintenance.*

CS1345 MICROPROCESSORS & PERIPHERALS

Module–I: Introduction 8086 Architecture: IBM PC Hardware Architecture; 8086 Registers, Bus,RAM organization, VRAM, Segment-Offset addressing, Fetch Decode Execute Cycle, 80x86features, Real and Protected Modes, Hexadecimal Number system, Study using Debug/codeview

Module–II:8086 Instruction Set: Addressing Modes; Arithmetic Instructions; Data Movement Instructions; Control Instructions, Input-Output Instructions, String Instructions, Logical Instructions; Simple Examples of the above initially using DOS Debug or Unix/Linux Code View and then on TASM/MASM or similar assemblers, Linking and relocation, Stacks, Procedures, Assembler directives.

Module–III:Interrupts: BIOS and DOS interrupts, Interrupt Vector Tables, COM and EXE files,Memory organization (conventional, upper, Extended and Expanded), Direct Memory access, Including assembly code in C programs, Writing TSRs in A/L and/or C language, introduction to computer viruses.

Module–IV:8086-based system design: Pins, signals and bus cycle, basic system components, interfacing memory, interfacing i/o devices, interfacing data converters, Programmable timers and event counters, Keyboard/Display Controllers, DMA controllers

REFERENCES
Core
 ❖ A NagoorKani ,*8086 Microprocessor and its applications*, McGrawhill, Second edition
Additional
 ▪ RS Goankar, *Microprocessor Architecture, Programming and Applications with 8086*, Wiley Eastern Edition

ACTIVITIES AND ASSIGNMENTS: *Miscellaneous Topics:.Features of Pentium, Pentium MMX, Itanium Processors, RISC, CISC, Motherboard of IBM PC, Drives, Peripherals, I/O buses, Parallel, Serial and USB ports.*

CS1346 PROGRAMMING LAB – III

The laboratory work will consist of 10-15 Experiments

Part A : Exercises using Debug

Part B : Programs using MASM/RASM

1. (a) Use the r command in Debug to display the values of the registers and then draw a diagram of the CPU showing the contents of all internal registers in (a) hex and (b) binary

(b) Use the e command in Debug to enter your name and address starting from offset 00ffh insegment 0565. Draw a diagram of the memory with contents based on the dump (d) command.

(c) Create a small text file using the DOS editor edit (for Example, a letter). Check the size using DOS dir command. Then give the file name along with Debug command and check the contents of the file and verify the length.

(d) Using debug command 'd', dump a 256-byte memory location and interpret the structure of theoutput

(e) Enter the following data in memory locations specified and diagrammatically show the contents of the memory in hex:

Data Type Location

'A' ASCII 0500:100

A Bh byte 0500:101

0A7Ch Word 0500:102

ABBAFACEh Double Word 0500:104

"INDIA" ASCII String 0500:110

(f) B800:0000 is a special memory location. Enter any ASCII codes here, each one followed by thebyte ffh, you will see something interesting happening in the left hand top corner of your screen.Note it down and try to explain it. Also repeat it with ffh replaced by 07, and 77.

2 (a) A sequence of word pairs are stored in location 0000:0000. The first word in the pair is an offset address and the second word is a segment address. Use dump and note down the first 5 such pairs

(b) The word stored in location 0040:0013 specifies the amount of usable memory in a PC. Dumpthis using the d command and convert it to decimal.

(c) Repeat (b) using a C program. To peep into a memory location using C, you must declare a far char pointer and then use the MK_FP function in C. Suppose p is such a pointer, then p=MK_FP(0X0040, 0X0013);

(d) The port address of the CRT Controller Chip is stored as a byte in location 0040:0063. Findthis using Debug.

(e) ROM BIOS specifies character attributes as a byte in the following way (you have already had an occasion to learn this in Practical I)

B R G B I R G B

----- -----

(1) (2) (3) (4)

(1) The bit B=0 for Nominal and =1 for Blinking (2) The next RGB represents Background colour

(3) The bit I=0 is for normal intensity and I=I is for bright display (4) The last RGB is for foreground (text) colour. RGB represents colurs as Black, Blue, Green, Cyan, Red, Violet, Brown and White corresponding to the valves 0 to 7. Display your name or any other word(s) of your choice with the following specifications, using debug:

First character Normal

Second Reverse

Third Blinking

Fourth Blinking White in Red background

Fifth Bright Blue in Blue back ground

Rest Upto our choice.

3-10. For each 8086 instruction, write simple Examples covering different possible cases and use Toption in Debug to trace the steps. Based on a register dump before and after Execution of instructions, explain the instructions.

11. (a) Two arrays of bytes each of length 10th are stored in the memory from location 0a00 and 0b00 respectively. Add the corresponding elements of the array and store the result starting from 0c00.

(b) Repeat (a), if the array is made up of words instead of bytes

(c) Modify (a) for swapping the contents of the arrays instead of adding. Also, repeat for the case of word array.

12. (a) Repeat (4) for multiplication instead of addition. Also repeat for word array instead of bytearray.

(b) Write programs to achieve the following calculations and interpret the results. All numbers are given in base 10: (A) 56*63 (b) -56*63 (c) +275*-228 (d) 100/10 (f) -98/105

13(a) How do you tackle forward reference while using Debug? Explain with an Example from Debug.

(b) Dumping the IVT, locate the address of the ISR for hardware interrupt on and unassemble it.

(c) Enter the ASCII codes corresponding to your name in memory locations starting from 0200. Invoke interrupt 21H, service AH=9 to display the string on the screen.

(d) In debug, without using '9' for quit, use int 21h. ah=4c to come out to DOS.

14. Under INT 10h, there are services available for setting video mode, setting cursor size, setting cursor position, reading cursor position, reading character attribute, write pixel, read pixel and get current video mode. Experiment each of these and report.15. Using interrupt 1AH, service 04h, read the real-time clock of the computer. Use this assembly segment in C program to generate areport of the program run time using a function called setclock( ) which returns the current time asan integer. By setting the clock at two points in a program, it should be possible to calculate thetime difference.

CS1347 INTERNET PROGRAMMING– LAB

The laboratory work will consist of 15-20 Experiments

Part A (HTML)
Part B (Javascript, XML, Perl, CGI)

1. Practicing basic HTML tags, text tags test styles, paragraph styles, headings, lists
2. Tables in HTML, Frames in HTML, nested frames, Link and Anchor Tags
3. Including graphics, video and sound in web pages, including Java applets
4. Layers & Image Maps
5. Creating animated Gifs, simple flash animations
6. Cascading Style sheets
7. DHTML
8. Creating and browsing XML database

9. Installing VRML plugins and viewing VRML source files
10. HTML forms and Fields
11. Exercises covering basic introduction to perl
12. Installing web server, setting CGI, connecting HTML forms to Perl Scripts (CGI programming)
13. Exercises covering basic introduction to Javascript

14-20: Development of a web site involving a variety of tools practiced above

REFERENCES
Core
   ❖ V.K. Jain, *Advanced Programming in Web Design*, Cyber Tech Publications

Additional
   ▪ H M Deitel, P J Deitel& A B Goldberg, *Internet and Worldwide web programming: How toProgram*, 3/e, Pearson Education

SEMESTER FOUR

CS1441 DESIGN AND ANALYSIS OF ALGORITHMS

Module–I: Algorithm Analysis: properties of a good algorithm, efficiency considerations, time complexity, space complexity, Asymptotic notations: Big O notation, best case, worst case, average case, simple examples, recursion and its elimination- recursive and no-recursive algorithms for binary search.

Module–II: Algorithm design techniques-Divide and conquer method: binary search as a divide-and-conquer algorithm, finding maximum and minimum, Strassen's matrix multiplicationGreedy method: Knapsack problem, minimum cost spanning trees, Prim's algorithm, Kruskal's algorithm.

Module–III: Dynamic programming: principle of optimality, all pair shortest paths, single source shortest paths, travelling sales person's problemBack tracking: implicit constraints and explicit constraints, 8 queen's problem, Branch and bound: LC search

Module–IV: Standard Algorithms: sorting- quick sort, merge sort, complexity of sorting algorithms, Deterministic and non-deterministic algorithms, NP-hard and NP complete- basic concepts.

REFERENCES
Core
- ❖ AnanyLevitin, *Introduction to design and analysis of algorithms*, Pearson, Second Edition

Additional
- ▪ Ellis Horowitz, SartajSahni, SanguthevarRajasekharan *−Computer Algorithms / C++*, SecondEdition- Universities Press.

ACTIVITIES AND ASSIGNMENTS:*Studies on complexities of various algorithms, best case, average case worst case analysis.*

CS1442 DATABASE MANAGEMENT SYSTEMS

Module–I: Introduction: evolution of data base systems, overview of database management systems, Relational data model, mathematical definition, candidate, primary and foreign keys, set operations on relations, insertion, deletion and update operations, attribute domains.

Module-II: Relational algebra and relational calculus, Introduction to SQL, Table creation, selection, projection and join using SQL

Module-III: Functional Dependencies − Inference axioms, normalization, 1NF, 2NF, 3NF and Boyce-Codd Normal forms, Lossless and lossy decompositions.

Module-IV: The E-R Model, Entities and attributes, 1-1 and many-1, many-many relationships. Security − Physical and Logical, Design and maintenance issues, integrity.

REFERENCES
Core
- ❖ Ramon A. Mata-toledo and Pauline K. Cushman, *Fundamentals of Relational Data Bases*, SchaumOutlines, Tata McGraw Hill

Additional
- ▪ AtulKahate, *Introduction to Data Base Management Systems*, Pearson Education

Internet resources:
- o www.pearson.co.in/AtulKahate,
- o www.edugrid.ac.in/webfolder/courses/dbms/dbms_indEX.htm

ACTIVITIES AND ASSIGNMENTS:*Study of features of MS Access, Open Office Base, Oracle, mySQL, emerging areas.*

CS1443 COMPUTER NETWORKS

Module I: Introduction to networks − Data Communication − Data flow simplex, Half duplex,Full duplex- Type of Connection − Point–to-Point, multi-drop. Bandwidth- bit rate, baud rate. Transmission media − Copper wires, fiber optics, Radio transmission, microwave, Satellite. switching-circuit,packet, message.

Module II: Protocols – standards- Layering, packets, Layered PDUs, ISO-OSI model, TCP/IP model – Comparison. Framing- bit oriented, byte oriented, Error correction – detection – parity,hamming code, CRC. Flow control, error control- Piggybacking, pipelining, Protocols-Noiselessand noisy channels – stop &wait, Stop &wait ARQ, Sliding window.

Module III: Access control - pure- slotted ALOHA, CSMA, CSMA/CD. LAN Standards – Ethernet, Token bus, Token ring. Interfacing devices – bridge, hub, switch, router, gateway.

Module IV: Internetworking- datagrams, fragmentation – routing-Distance vector routing, Link state routing.Concepts of congestion control-leaky bucket algorithm. Process to Process delivery -TCP, UDP, Application Layer -DNS, Remotelogin, file transfer protocol(FTP).

REFERENCES
Core
  ❖ Brijendra Singh, *Data Communication and Computer Networks*, 2/e, PHI
Additional
  ▪ Behrouz A Forouzan, *Data Communication and Computer networks*, 4thed,McGraw Hill
  ▪ Achyut S Godbole, *Data communications and networks*, McGrawHill, Second
Internet resources:
  o www.netbook.cs.purdue.edu, www.labbook.cs.purdue.edu,
  o www.edugrid.ac.in/webfolder/courses/cn/cn_indEX.htm

ACTIVITIES AND ASSIGNMENTS:*Practical networking- networking in LINUX, Peer–to-peer networking, Measurement and packet analysis, blue tooth, emerging topics*

CS1444 PROGRAMMING IN JAVA

Module–I: Brief History of Java, Special Features of Java, Data Type & Operators in Java, Arrays, Objects, the Assignment Statement, Arithmetic Operators, Relational and Logical Operators in Java, control Structures, The Java Class, Constructor, Simple Java Application, simple Java Applet, Finalizers, Classes inside classes : composition.

Module-II: Inheritance & Interface, Deriving Classes, Method Over-riding, Method Overloading, Access Modifiers, Abstract Class and Method, Interfaces, Packages, Imports and Class Path.

Module-III: Exception Handling, The Try-Catch Statement, Catching more than one Exception, The Finally Clause, Generating Exceptions, Threads: Introduction, Creating Threads in Applications, Method in Thread Class, Threads in Applets.

Module-IV: Java APIs – overview of APIs, IO Packages, Java Input Stream Classes, Java Output Stream Classes, File Class, Graphic & Sound: AWT and Swing, Graphic methods, Fonts,

Loading and Viewing Images, Loading and Playing Sound, AWT & Event Handling, Layouts, JDBC.

REFERENCES

Core
- ❖ Java Programming, *Schaum Outline Series*

Additional
- ▪ Deitel, *Java: How To Program*, Pearson Education

Internet resources:
- o http://javaboutique.internet.com/articles/ITJqanda/
- o http://java.sun.com/
- o http://freewarejava.com/
- o http://java.sun.com/developer/onlineTraining/

CS1445 MINOR PROJECT

1. AIM:

➢ Minor project will give an opportunity for students to prepare for the major project and alsocontribute to achieving some of the objectives of the major project.

➢ Minor projects shall also serveas an opportunity for producing and distributing socially useful software.

2. GUIDELINES FOR MINOR PROJECT

✓ Team size should not exceed three;Individual projects are to be permitted, if desired by any student.

✓ It should be purely internal in nature.

✓ The number of records to be submitted is limited to team size + one (Evaluation copy)

✓ The content of all copy of records should be same.

✓ Major project report format should be followed for making records.

CS1446 PROGRAMMING LAB – IV

The laboratory work will consist of 15-20 Experiments

Part A

1. Testing out and interpreting a variety of simple programs to demonstrate the syntax and use of the following features of the language: basic data types, operators and control structures.
2. Class definitions and usage involving variety of constructors and finalizers
3. Programs involving various kinds of inheritances,
4. Program involving Method Over-riding, Method Over-loading
5. Program involving Abstract Class and Methods

Part B

6. Program involving Interface,
7. Program to demonstrate creation and handling of packages, their imports and Class Path.
8. Programs involving a variety of Exception Handling situations
9. Program to define a class that generates Exceptions and using objects of the class.
10. Program involving creating and handling threads in applications and applets.
11-12: Programs to demonstrate methods of various i/o classes
16. Programs to demonstrate methods of string class
17. Program to demonstrate AWT/Swing graphic methods
18. Program for Loading and Viewing Images, Loading and Playing Sound
19. Programs to demonstrate various Layouts
17-18 Programs to demonstrate event handling
19. Program to demonstrate simple server-client (using a single m/c both as client and server)
20. Debugging programs involving syntactic and/or logical errors

INTERNET RESOURCES
o   http://java.about.com/od/idesandeditors/
o   http://www.programmingtutorials.com/java.aspx

CS1447 DATABASES LAB

The laboratory work will consist of 15-20 Experiments. Tools to be used include: Personal Oracle 8/ MSAccess/OpenOffice Base/Java. Experiments will cover creating tables including defining relations betweenthem, practicing SQL, Experiments designed around a case study, miscellaneous topics including security,connecting databases to front-end applications. Some sample topics are given below:

Part A
1. SQL statement for creating, listing, dropping, checking, updating tables
2. Record manipulation using-insert, delete, update
3. Experiments that clarify the importance of keys (Except foreign key)
4. Queries with an Expression and a column alias
5. A simple query that aggregates (groups) over a whole table
6. A query with a literal string in the SELECT list
7. Queries with sub string comparison and ordering
8. Query using the "IS NULL" syntax to list (compare '=NULL' instead of IS NULL")
9. Finding values within a certain range
10. Using the --"BETWEEN" keyword

Part B
11. A Join between two tables (foreign key)
12. Nested queries
13. The EXISTS and UNIQUE function in SQL
14. Renaming attributes and joined tables
15. Statements related with VIEWs

<u>SEMESTER FIVE</u>

CS1541 FREE AND OPEN SOURCE SOFTWARES (FOSS)
Module I: Open source software: Features, advantages over proprietary software, examples**,
Free software:** concepts, features, Free software Vs Open Source software, Free software movements. Policies, GPL, Free OS, History and Features of Linux, Various flavours of Linux, Linux Kernel and Shell, Graphical Desktops- GNOME, KDE, Linux File System and Directories

Module-II: The building blocks of PHP: variables, globals& superglobals**Data types**: Settype,type casting, test type, **Operators & Expressions**, **Flow control functions in PHP**, **Functions**: Defining a function variable scope,calling a function,returning values ,setting default values for arguments, passing variable reference   **Arrays**: creating arrays(associative & multidimensional), Array related functions **Working with strings:** Formatting strings, indexing, strlen() functions

Module-III: Forms in PHP: Creating a simple input form, combining HTML & PHP code on a single page, redirecting the user ,creating a send mail form, File upload form   **Cookies**: Introduction, setting a cookie with PHP, deleting a cookie, session function overview: starting a session,working with session variables, passing session IDs in the query string, destroying sessions &unsetting variables

Module-IV: Database concepts: Open source database software: MySQL features   MySQL data types: Numeric,date & time,string   Table creation in MySQL:insert,select,where clause,ordering the result,like operator Selecting Multiple tables:using join,using queries Modifying records:update command,replace command,delete command date & time functions in MySQL Interacting with MySQL using PHP:connecting to MYSQL ,Executing queries, Retrieving error messages,inserting data with PHP, retrieving data with PHP

. REFERENCES
 Core
- ❖ Julie C.Meloni, PHP, MySQL and Apache,Pearson Education
- ❖ Ivan Byross, HTML,DHTML,Javascript,Perl, BPB Publication

CS1542 SYSTEM SOFTWARE

MODULE I:INTRODUCTION System software and machine architecture − The simplified Instructional Computer (SIC) - Machine architecture - Data and instruction formats - addressing modes - instruction sets - I/O and programming.

MODULE II: ASSEMBLERS Basic assembler functions - A simple SIC assembler − Assembler algorithm and data structures - Machine dependent assembler features - Instruction formats and addressing modes – Program relocation - Machine independent assembler features -

Literals – Symbol-defining statements – Expressions - One pass assemblers and Multi pass assemblers.

MODULE III:LOADERS AND LINKERS Basic loader functions - Design of an Absolute Loader Machine dependent loader features - Relocation – Program Linking – Algorithm and Data Structures for Linking Loader - Machine-independent loader features – Automatic Library Search – Loader Options - Loader design options - Linkage Editors – DynamicLinking – Bootstrap Loaders

MODULE IV: MACROPROESSOR AND SYSTEM SOFTWARE TOOLS Basic macro processor functions - Macro Definition and Expansion – Macro Processor system software tools, Text editors - Overview of the Editing Process - User Interface – Editor Structure. -Interactive debugging systems - Debugging functions and capabilities – Relationship with other parts of the system – User-Interface Criteria.

. REFERENCES
Core
❖ Leland L. Beck, *System Software – An Introduction to Systems Programming*, 3rdEdition, Pearson Education Asia, 2006.

Additional
▪ D. M. Dhamdhere, *Systems Programming and Operating Systems*, Second Revised Edition, Tata McGraw-Hill, 2000.

CS1543 COMPUTER GRAPHICS

Module I: Introduction: graphic data representation, concept of pixels, resolution, aspect ratio, Raster scan display, Random Scan display, video adapter, frame buffer, display technology-CRT, LCD, LED, smart devices (featurewise comparison only), Output Primitives:Straight Line, DDA algorithm, Bresenham's Line Algorithm, Circle- Mid Point Circle Algorithm, polygon filling algorithms- boundary fill, scan-line algorithm, Aliasing and Anti-aliasing.

Module II: Two dimensional Transformations: Translation, scaling, fixed point scaling, rotation, reflection, transformation with respect to arbitrary points. Application of homogeneous coordinates for uniform matrix operations, composite transformations, Windowing and clipping:Window to viewport transformation, Clipping- Point clipping, Line Clipping, Cohen-Sutherland Line Clipping algorithms, Polygon Clipping-Sutherland-hodgeman algorithm.

Module III: 3D Concepts and Techniques: 3D display techniques, 3D Transformations, 3D modelling schemes, Projection-parallel projections, perspective projection, Visible Surface Detection- Hidden Surface removal Algorithms-scan line method,Z-buffer method.

Module IV: Colour Illumination methods: color models-RGB, HSI, CMYK,Illumination model and light sources, Specular reflection, Intensity attenuation, shadow, Polygon Shading methods, animation**,**morphing-tweening, warping (Concepts only) zooming, panning, rubberband lines (concepts only)

REFERENCES

Core
- ❖ Amarendra N Sinha and Arun D Udai, *Computer Graphics*, McGraw Hill publications

Additional
- ▪ Donald Hearn, M. Pauline Baker, *Computer Graphics (C Version) 2/e,* Pearson

Internet resources:
- o www.prenhall.com/hearn,
- o www.prenhall.com/bookbind/pubbooks/hill4
- o www.povray.org ray tracing and 3D morphing,
- o www.cs.unc.edu/~pxpl/home.html

CS1551 OPEN COURSE
CS1551.1 INTERNET TECHNOLOGY

MODULE I- Introduction to Computer Networks- Advantages of Networks, Goals of Networks, Types of Networks- LAN,MAN,WAN, Internet , Public Networks, LAN topologies- Bus, Star, Ring, Mesh.

MODULE II- Networking Devices- Interconnecting Issues, Connectivity Devices, Hubs, Switch, Bridges, Routers.

MODULE III- Introduction to Internet -Meaning of Internet, WWW- History, Working of Internet, Browsing, Searching the Web, Internet protocols- TCP/IP Protocol suite, UDP, IP addresses, IP Versions – IPV4, IPV6, Services of the Internet- FTP, HTTP, Email.

MODULE IV- HTML- Understanding HTML, Text tags; Graphics, Video and Sound Tags; Link and Anchor Tags; Table Tags; Frame Tags; Miscellaneous tags (layers, image maps etc);

REFERENCES

Core
- ❖ Douglas E Comer, *Computer Networks and Internets*, 4/e, Pearson Education

Additional
- ▪ Andrew S. Tanenbaum, *Computer Networks*, 4/e, Pearson Education

CS1551.2 LINUX ENVIRONMENT

Module I- Operating Systems- Necessity of OS, Types of OS-Batch Systems, Time Sharing Systems, Real time Systems, Basic Structure of An OS- Kernel, Shell, File System, OS as a Resource Manager, General principles of Resource Management

Module II- Introduction to Linux- History and Features of Linux, Various flavours of Linux, Linux Kernel and Shell, Graphical Desktops- GNOME, KDE, Linux File System and Directories, Linux commands bc, cal, cat, cd, chgrp, chmod, clear, cmp, cp, kill, rm, rmdir, tty, wc, who, grep, write, telnet, whois, mv, find, ps, mkdir, more, date, mount, show, mount etc. Pipeline and redirection concepts, using floppy and cd- rom in linux

Module III-Open Office.org-Open Office Writer-Parts of the OpenOffice.org Window, Editing and Writing a Writer document, spell checker, autocorrect, Thesaurus, create table, table formatting, finding items in a document, header and footer, create and modify page numbers, adding graphics, borders and colours

Module IV- Open Office.org-Open Office Calc- Entering data in a spreadsheet, spreadsheet math, columns, lookup functions, charting data, Open Office Impress- Create a new presentation, insert, copy and delete slides, formatting text, bulleted and numbered lists, adding clipart, pictures, charts and spreadsheets, slide settings and transitions, animating slides, previewing and running a slideshow

 REFERENCES
Core
  ❖ Pramod Chandra P Bhat, *An Introduction to Operating Systems: Concepts and Practice,* 2/e PHI,2007

Additional
  ▪ Richard Peterson, *Linux Programming: A Beginners Guide*, DreamTech

ACTIVITIES AND ASSIGNMENTS: *Packages in Linux, Case study of open source softwares, comparison of Linux with Windows*

CS1551.3 BUSINESS INFORMATICS

Module–I: History of e-commerce, definition, classification- B2B, B2C, C2C, G2C, B2G sites, ecommerce in education, financial, auction, news, entertainment sectors, Doing e-Commerce.

Module–II: Electronic payment systems – relevance of currencies, credit cards, debit cards, smartcards, e-credit accounts, e-money, security concerns in e commerce, authenticity, privacy, integrity,non-repudiation, encryption, secret key cryptography, public key cryptography, digitalsignatures, firewalls

Module–III: Mass marketing, segmentation, one-to-one marketing, personalization and behavioural marketing, web advertising, online advertising methods, advertising strategies and promotions, special advertising and implementation topics.

Module IV-Mobile Commerce: attributes and benefits, Mobile Devices, Computing software, Wireless Telecommunication devices, Mobile finance applications, Web 2.0 Revolution, social media and industry disruptors, Virtual communities, Online social networking: Basics and

examples, Web 3.0 and Web 4.0, Civil law, intellectual property law, common law and EC legal issues

REFERENCES
Core

❖ Erfan Turban et.al., *Electronic Commerce–A Managerial Perspective*, Pearson Education

Additional

▪ R Kalokota, Andrew V. Winston, *Electronic Commerce – a Manger's guide*, Pearson

Internet resources:

o www.ecommercetimes.com,
o www.online-commerce.com,
o www.rsa.com,
o www.ntsecurity.com
o www.easystorecreator.com/ecommercetutorial.asp

ACTIVITIES AND ASSIGNMENTS: *Case study of two internationally successful e-commerce web sites and two Kerala-based e-commerce web sites; IT act (India) and e-commerce.*

CS1561 ELECTIVE
CS 1561.1 MULTIMEDIA SYSTEMS

Module–I: Concept of Multimedia, Hypertext, Hypermedia, History of multimedia, Multimediahardware: CD-ROM, DVD, Microphone, Speakers, Soundcards, Video Camera, MIDI, Applicationsof multimedia in entertainment, education, health etc.

Module–II: Graphic and image data representation, spatial and temporal resolution of images, greylevel and color images, simple image processing (quantization, negatives, filtering – low and hi-pass,edge detection, contrast enhancement), animations, image data compression, image fileformats

Module–III:analog and digital video, frame rates, sync, resolution, color video formats-NTSC,PAV and SECAM, analog video artifacts, video equipments, digital video compression

Module–IV: Speech processing – digitization of speech, characteristics of speech, noise,representation of speech, audio filtering, audio compression – MP3 and OGG, synthetic sounds -MIDI

REFERENCES
Core

❖ Ralf Steinmetz KlaraNahrstedt,*Multimedia Applications*, Springer International Edition

Additional

▪ Malay K. Pakhira, *Computer Graphics Multimedia and Animation*, PHI, 2008.
▪ Judith Jeffcoate, *Multimedia in Practice: Technology & Applications*, PHI

ACTIVITIES AND ASSIGNMENTS: *Multimedia on the mobile platform, Multi-media networks, Streaming media, quality of service, Introduction to Macromedia Flash, Multimedia on Linux, Multimedia on the web. Virtual Reality systems*

CS1561.2BIOINFORMATICS

Module I:Introduction: Aim & Scope of Bioinformatics; Biological foundations of Bioinformatics – Cell, Gene, Nucleic acids, Proteins, Structure of DNA, RNA and Proteins; Storage of Genetic Information; Central Dogma of Molecular Biology; Branches of Bioinformatics;

Module II: Biological Databases:*(Overview of databases only)* Primary Databases – Nucleotide Sequence databases (GenBank, DDBJ, EMBL); Protein Sequence databases (SWISS-PROT, PIR); Secondary Databases – PROSITE, PRINTS, BLOCKS; Structure databases – PDB, SCOP, CATH; Metabolite database – KEGG; Literature database – PubMed; Data storage and Retrieval Tools – Entrez, SRS;

Module III: Sequence Alignment:*(Basics of sequence alignment and tools)*Introduction to Sequence Comparison - Pairwise Alignment and Multiple Sequence Alignment; Global & Local Alignments, , Gaps, Patterns of Substitution; Scoring Matrices – PAM, BLOSUM; Sequence comparison Tools – BLAST, FASTA; Prediction Tools – GENSCAN, SNP; Visualization Tools – RasMol, PyMol, SWISS-PDBViewer;

Module IV: Related areas: Understanding Genomics, Proteomics, Pharmacogenomics, DNA Microarray; DNA Fingerprinting; Application of Bioinformatics in Computer-Aided Drug Design; Importance of Perl language in Bioinformatics;

REFERENCES
 Core
   ❖ Selzer-Marhofer-Rohwer, *Applied Bioinformatics – an introduction*, Springer
Additional
   ▪ Dan-E-Krane, Michael.L.Raymer, *Fundamental Concepts of Bioinformatics*, Pearson Education
   ▪ ZhumurGhosh, BibekanandMallick, *Bioinformatics – Principles and Applications*, Oxford Higher Education

ACTIVITIES AND ASSIGNMENTS: Search the web using PubMed, Retrieving DNA and Protein Sequences, Simple programs in Perl, Open-Source Bioinformatics Software;

CS1561.3TRENDS IN COMPUTING

Module I: Grid Computing:*Basic Concepts*: Application areas; Grid Layered Architecture; Distributed Computing; Data Grids – Resource Sharing; Pathway to Grid Computing; **Cloud Computing** – Overview, Web 2.0 and the cloud, Cloud Types, Uses of Cloud; Components of

Cloud Computing - Software as a Service, Platform as a Service, Infrastructure as a Service, Identity as a Service (**Concepts only**) ;

Module II:Data storage in the cloud: Understanding, Advantages and Disadvantages of Cloud-Based Data Storage; Disaster Recovery – understanding threats; Service-Oriented Architecture – understanding SOA, Web services;

Module III:Soft Computing: Soft Computing VS Hard Computing; Introduction to Neural Networks – Intelligence, Neurons, Artificial Neural Networks, Application Scope of Neural Network, Brain VS Computer, Problem areas, Training of Artificial Neural Networks – Supervised and Unsupervised; From ordinary sets to Fuzzy sets – Basics of Fuzzy Logic Theory, Foundations of fuzzy logic – Fuzzy Sets, MembershipFunctions;

Module IV:Evolutionary Algorithm: Traditional Algorithm VS Genetic Algorithm; Genetic Algorithm Operators – Reproduction (Roulette Wheel Selection, Tournament Selection), Crossover (one point crossover, two point crossover, uniform crossover), Mutation; Comparison of Operators; Genetic Algorithm Cycle; Applications;

REFERENCES
Core
- ❖ Venkatakrishna&etal,*Principles of Grid Computing – Concepts And Applications*, Ane Books
- ❖ Kris Jamsa,*Cloud Computing*, Jones &Bartlett Learning.
- ❖ Rahul Deva &GarimaKulshreshtha, *Soft Computing*, Shrof Publishers & Distributors Pvt.Ltd.

Additional
- ▪ Rajkumar Buya and etal,*Cloud Computing – Principles And Paradigms*, Wiley Publishers.
- ▪ S.Rajasekharan & G. A.Vijayalakshmi Pai, *Neural Networks, Fuzzy Logic and Genetic Algorithms Synthesis and Applications*, PHI Learning Private Limited
- ▪ Manish Mahajan & RajdevTiwari,*Introduction to Soft Computing*, Acme Learning.
- ▪ Dilip K Pratihar,*Soft Computing – Fundamentals & Applications*, Narosa.
- ▪ S.N. Sivanandam, S.N.Deepa, *Principles of Soft Computing*, Wiley India.

ACTIVITIES AND ASSIGNMENTS: *Study of different Grid Projects, Migrating to Cloud, Mobile Cloud Computing, Cloud-based applications, Engineering and Industrial applications of Soft Computing, Support Vector Machine*

CS1544 COMPUTER GRAPHICS LAB

The laboratory work will consist of 10-15 Experiments

Part A
1. Implementing DDA &Bresenham algorithm for line drawing, effecting different line styles
2. Implementing circle drawing algorithms, drawing ellipses and sectors
3. Representing 2D object data files (containing vertex and edge lists) and implementingprograms which read and plot these objects.

4. Implementing 2D transformations (programs which prompt for type of transformation,parameters and name of object data file and plot object and transformed object in 2 colors)
5. Implementing composite transformations (modification on the above, program prompts fornumber of transformations, accepts parameters for each and then plots all stages oftransformations in different colors

Part B

6. Implementing Windowing and Clipping algorithms
7. Implementing a filling algorithm, reading the object from data file
8. Representing 3D object data files (containing vertex and edge lists) and implementing programs which read and plot these objects.
9. Implementing 3D transformations (programs which prompt for type of transformation, parameters and name of object data file and plot object and transformed object in 2 colors)
10. Implementing composite transformations
11. Implementing hidden surface removal by surface normal computation: to be tried out on acube and/or a sphere

REFERENCES
Core
- ❖ Malay K. Pakhira, *Computer Graphics Multimedia and Animation,* PHI, 2008
- ❖ D P Mukherjee, *Fundamentals of Computer Graphics and Multimedia*, PHI
- ❖ Peter Cooley, *The Essence of Computer Graphics*, Pearson Education

CS1545: FREE and OPEN SOURCE SOFTWARE (FOSS) LAB

PART A
Installing and Configuring Linux, Partition Creation, Familiarization of using basic Linux commands - cat with options, ls with options, mkdir,cd, rmdir, cp, mv, cal, pwd, wc, grep with options, I/O redirection using >,>>,<,| etc. Using Desktop-GNOME-KDE- Linux Commands Accessing and Running Applications.

Introduction to vi editor- Three modes in which vi editor works, Commands in vi input mode for inserting, replacing, saving and quitting, Commands in vi for deleting, paging and scrolling, Undoing last editing instructions, search and replace, Emacs Editor

PART B
Understand shell programming and use of different conditional statements in shell programming-Basic Shell Commands - Shell programming statements, operators and conditional statements

Administration: Understanding System Administration: Root login-super user-GUI tools, commands and Log files-Configuring Hardware-File System and Disk Management- Monitoring performances.

Any one application as case study (GiMP, SciLab, Moodle, Joomla etc.) (**for lab records only, not for ESE**)

REFERENCES
- ❖ Christopher Negus,*Red Hat Linux 9 Bible*, WILEY- Dreamtech, New Delhi,
- ❖ Thomas Schenk, *Red Hat Linux System Administration*, Techmedia, New Delhi,2003.

SEMESTER SIX

CS1641 INTRODUCTION TO INFORMATION SECURITY

Module I: Information Security: Network security, Confidentiality, integrity, authentication, security policy, basic network security terminology, cryptography, symmetric encryption, substitution ciphers, transposition ciphers, steganography, Block ciphers, modes of operation, Data Encryption Standard, Public key cryptography, applications, strength and weakness, RSA algorithm, key distribution (concepts only).

Module II:Authentication, authentication methods, message digest, digital signatures, digital signature algorithm, DSS, E-mail security: Pretty Good Privacy, working of PGP, S/MIME, MIME, IP Security, Architecture, IPSec: strengths and benefits, IPv4, IPv6, ESP protocol, Web Security: Secure Socket layer, SSL session and connection.

Module III:Malicious Software, viruses, working of anti-virus software, worms, Trojans, spyware, firewall, characteristics of firewall, packet filters, application level gateways, firewall architecture, trusted systems.

Module IV: Security and Law:- Regulations in India. Information Technology Act 2000/2008.Cyber Crime and the IT Act 2000/2008.Indian Contract Act 1872, Indian Penal Code, Indian Copyright Act, Consumer Protection Act.Future Trends – The Law of Convergence.

REFERENCES
Core
- ❖ Brijendra Singh, *Cryptography & Network Security*, PHI.
- ❖ Pachghare, V.K., *Cryptography and Information Security,* PHI.

ACTIVITIES AND ASSIGNMENTS: *AES, Blowfish algorithms, Kerberos, Comparison of PGP and S/MIME, study of common malicious software, antiviruses.*

CS1642 ARTIFICIAL INTELLIGENCE

Module–I: Introduction to AI: Intelligence & AI: Turing Test, branches of AI, AI and search process: Combinatorial Explosion, branching factor, forward and backward reasoning, need for

heuristics, search methods: Depth-first, Breadth-first, Best First, Hill-climbing, Game Playing: Min-Max, alpha-beta pruning.

Module–II: Knowledge Representation & Reasoning: Logic: Propositional Logic, Syntax & Semantics, Normal forms in prepositional logic; Predicate Logic: Normal forms in predicate logic; Knowledge Representation Techniques: Procedural vs Declarative Representation; Semantic Nets, Frames, Scripts.

Module–III: Speech, language and language Processing: Speech Processing; speech coding, speech recognition, speech synthesis; Natural Language Processing: general concepts and issues, ambiguity in natural languages, General Introduction to parsing techniques.

Module–IV: Expert Systems: Architectures; Knowledge Bases and Inference Engines; MYCIN and DENDRAL (Basic Concepts); Applications; Robots, software agents.

REFERENCES
 Core
  ❖ Ben Coppin, *Artificial Intelligence Illuminated*, Narosa

 Additional
  ▪ VS Janakiraman, K Sarukesi, P Gopalakrishnan, *Foundations of Artificial Intelligence*, Macmillan

ACTIVITIES AND ASSIGNMENTS: Miscellaneous Topics: Generic Introduction to LISP and Prolog; Critic of Artificial Intelligence; Neural Network Models; Genetic Algorithms; Molecular Computers; Future of AI.

CS1643 E-COMMERCE & E-GOVERNANCE

Module–I: History of e-commerce, definition, classification- B2B, B2C, C2C, G2C, B2G sites, e-commerce in education, financial, auction, news, entertainment sectors, Doing e-Commerce.

Module–II: e-payment systems – Main concerns in internet Banking-Digital payment requirements- Digital token based e-payment systems- Classification of new payment systems-credit cards, debit cards, smart cards, e-credit accounts, e-money,-Risk and e-payment systems-Designing e-payment systems.

Module-III:e-Governance- Introduction; Business of Government; Need for Change; Architecture of e-Governance; Architecture Technology Requirements – Generic Requirements, Application Requirements ; Market Opportunity in e-Governance; e-Business; Government Online; Obstacles to Counter; Four phases of e-Government – G2B; G2C; G2E, G2G; Case Studies in India;

Module-IV: Public-Private-Partnership – a new model in governance; Outsourcing e-Government activities; Technology in Government – Smart Cards in the Indian Scenario, Biometrics in the Indian Scenario; Location Based Service System (LBS), Application of LBS in Government sector; Open Source Software; Future of e-Governance

REFERENCES
Core
- ❖ Erfan Turban et. al., *Electronic Commerce–A Managerial Perspective*, Pearson Education
- ❖ M.P.Gupta, Prabhat Kumar, Jaijit Bhattacharya , Government-Online , Opportunities And Challenges, Tata Mcgraw Hill

Additional
- ▪ P T Joseph S.J, *E-Commerce-An Indian Perspective*, Fourth edition, PHI.
- ▪ R Kalokota, Andrew V. Winston, *Electronic Commerce – a Manger's guide*, Pearson
- ▪ David Whiteley,*E-Commerce Strategy, Technologies and Applications*, Tata Mc-Graw Hill.

ACTIVITIES AND ASSIGNMENTS:: *M-commerce; case study of two internationally successful e-commerce web sites and two Kerala-based e-commerce web sites; IT act (India) and e-commerce.*

CS 1661 ELECTIVES
CS1661.1 MOBILE COMPUTING

Module I: Mobility of Bits and Bytes, Wireless – The Beginning, Mobile Computing, Dialogue Control, Middleware and Gateways, Application and Services, Developing Mobile Computing Applications, Security in Mobile Computing, Standards, Standard bodies. Mobile Computing Architecture:- Internet – The Ubiquitous Network, Architecture for Mobile Computing. Three – Tier Architecture, Design Considerations for Mobile Computing, Mobile Computing through the Internet.

Module II: Bluetooth, RFID, WiMAX, Mobile IP, IPv6, GSM Architecture, GSM entities, Call Routing in GSM, GSM addresses and identifiers, Network Aspects in GSM, GSM frequency allocation, Authentication and security.

Module III: Mobile computing over SMS, Short Message Services, Value Added services through SMS, GPRS, GPRS and packet Data Network, GPRS Network Architecture, GPRS Network Operations, Data Services in GPRS, Applications for GPRS, Limitations of GPRS.

Module IV: WAP, MMS, GPRS Applications, CDMA and 3G:- Spread-spectrum technology, IS-95, CDMA Vs GSM, Third generation network, Applications on 3G, Wireless LAN architecture, Mobile AdHoc Networks and Sensor Networks, Security Issues in Mobile Computing:- Security Techniques and Algorithms, Trust, Security Models.

REFERENCES
Core
   ❖ Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal, *Mobile Computing – Technology, Applications and Service Creation*, 2nd ed. TMH.

CS1661.2 EMBEDDED SYSTEMS

Module –I: Introduction to Embedded Systems, Stand-alone and real-time embedded systems, network appliances and mobile devices, Requirements of embedded systems, Embeddedprocessors, memory, OS, programming languages and tools.

Module-II: Hardware Architecture for embedded systems: Processors, micro-controller, microprocessor, DSP processor, memory, ADC and DAC, Display units and keypads, communication interfaces.

Module III: Embedded systems development: EPROM programmer and eraser, Embeddedsystem development process, software development environments.

Module-IV: Embedded OS: Windows XP and open source OSs, Real-time OSs: RTLInux and eCOS, Mobile OSs, Programming in C and assembly for embedded systems. Emulators.

REFERENCES
Core
   ❖ Dreamtech Software Team, *Programming for embedded systems*, Wiley Dreamtech India

Additional
   ▪ Daniel W Lewis, *Fundamentals of embedded software*, Pearson Education

Internet resources:
   o www.vissim.com simulation and embedded system design software (free)

ACTIVITIES AND ASSIGNMENTS:*Applications of embedded systems: hand-held devices, consumer electronics, control systems, biomedical systems, data communication. Recent developments, System on a chip, Smartcards.*

CS1661.3DATA MINING & DATA WAREHOUSING

Module I: Overview: Data, Information, Knowledge; Knowledge Discovery; Types of data for Mining; Application Domains; Data Mining Functionalities; Data Processing – Understanding Data, Pre-processing Data –Forms of Data Pre-processing, Data Cleaning (Definition and Phases only), Need of Data Integration, Steps in Data Transformation, Need of Data Reduction;

Module II: Data Warehouse: Database Systems & Data Warehouses – Difference; Data Warehouse – Definition & Features; Multidimensional Data Model – Data Cubes ; OLAP (Definition and Functions only); Market Basket Analysis; Association Rule – Overview; Criteria

for classifying Frequent Pattern Mining ; Mining Single Dimensional Boolean Association Rule – Apriori Algorithm;

Module III: Classification: Classification vs Prediction; Issues; **Use of** Decision Trees for Classification; Bayesian Classification – Bayes' Theorem, Naïve Bayesian Classifier; Lazy Learners - k–Nearest Neighbour Method; Rule-Based Classification – Using IF-THEN rules for classification;

Module IV: Cluster Analysis: Introduction & Requirements; Characteristics of Clustering Techniques; Types of Data in Cluster Analysis; Categories of Clustering- Partitioning Methods; Outlier Detection in Clustering;

REFERENCES
Core
 ❖ SunithaTiwari&NehaChaudhary,*Data Mining And Warehousing*, DhanpatRai& Co

Additional
 ▪ Jiawei Han And MichelineKamber,*Data Mining Concepts And Techniques*, Elsevier
 ▪ Arun K Pujari,*Data Mining Techniques*, Universities Press
 ▪ G.K Gupta,*Introduction To Data Mining With Case Studies*, PHI

ACTIVITIES AND ASSIGNMENTS:*Mining Web, Temporal, Text, Multimedia, Medical data and other Applied Data Mining areas; OLAP tools; Introduction to RapidMiner and other free and open-source data mining tools;*

CS1644 MAJOR PROJECT & VIVA
1. AIM:
 ➢ To expose student to industry-standard project practices, through a real-life project work under timeand deliverable constraints, applying the knowledge acquired through various courses.
2. OBJECTIVES:
 ✓ To provide an opportunity to apply the knowledge gained through various courses in solving a reallife problem
 ✓ To provide an opportunity to practice different phases of software/system development life cycle
 ✓ To introduce the student to a professional environment and/or style typical of a global IT industry
 ✓ To provide an opportunity for structured team work and project management
 ✓ To provide an opportunity for effective, real-life, technical documentation
 ✓ To provide an opportunity to practice time, resource and person management.

3. PROJECT GUIDELINES
 ▪ Group Size – Maximum 3
 ▪ No. of records – No. of group members+ 1 (Department copy)
 ▪ Certificate should include the names of all members

The minimal phases for the project are: Project search, finalization and allocation, Investigation of system requirements, Data and Process Modelling, System Design, Program design, Program coding and unit testing, System integration, System implementation and acceptance testing.

3.1 Planning the Project: The Major Project is an involved Exercise whichhas to be planned well in advance. The topic should be chosen in Semester 4 itself and the casestudy of Course CS1302 should as far as possible, be based on the project topic, though on Exceptional cases, for valid reasons, the project guide may waive this condition. Related reading, training and discussions should start from semester 5 itself.

3.2 Selection of project work: Project work could be of 3 types:

a)Developing solution for a real-life problem: In this case, a requirement for developing a computer based solution already Exists and the different stages of system development life cycle isto be implemented successfully. Examples are Accounting Software Package for a particular organization, Computerisation of administrative functions of an organization, Web Based Commerce, etc. The scope for creativity and Exploration in such projects is limited, but if done meticulously, valuable Experience in the industrial context can be gained.

(b) Innovative Product development: These are projects where a clear-cut requirement for developing a computer based solution may not be Existing, but a possible utility for the same is conceived by the proposer. An Example is a Malayalam Language Editor with Spell Checker, Computer Music Software for Indian Music, Heat Engines Simulation Software for eLearning, Digital Water Marking Software,

(c) Research level project: These are projects which involve research and development and may not be as structured and clear cut as in the above case. Examples are Malayalam CharacterRecognition, Neural Net Based Speech Recogniser, Biometric Systems, Machine Translation System etc. These projects provide more challenging opportunities to students, but at EX level is a difficultchoice. If any student identifies proper support in terms of guidance, technology and referencesfrom External organizations and also the supervisors are convinced of the ability of the student(s)to take up the project, it shall be permitted. The methodology and reporting of such projects couldbe markedly different from type (a) and is left to the proposer/external supervisor of the projects.

3.3 Selection of Team: To meet the stated objectives, it is imperative that Major Project is done through a team effort**.** Though it would be ideal to select the team members at random (drawing lots) and this should be strongly recommended, due to practical considerations, students may alsobe given the choice of forming themselves into teams with 3 to 5 members (teams less than 3members may be permitted in Exceptional cases, for valid reasons). A gender mix should also bestrongly suggested. A team leader shall be elected through drawing lots. Teams shall maintainteam meeting minutes and ensure that every team member has tasks assigned in writing. Teammeeting minutes shall form a part of the Project Report. Even if students are doing projects asgroups, each one must independently take up different modules of the work and must submit thereports also independently (though, in such cases, some common materials is permissible).Evaluation will also be done independently.

3.4 Selection of Tools: No restrictions shall be placed on the students in the choice of platforms/tools/languages to be utilized for their project work, though open source is strongly recommended, wherever possible. No value shall be placed on the use of tools in the evaluation of the project.

3.5 Selection of Organisation & Guide: No restrictions shall be placed on the students in the choice of organization where project work may be done, in terms of locality, type (public/private) etc. It is the duty of the Head of Institute/Principal of College to ensure that the Aim, Objectives and full project guidelines are communicated to the external organization. The guide should ideally be a post-graduate with minimum 2 years of work experience.

Students may also choose to do project in the college/institute (or partially in the college/institute and partially in an external organization), especially product-based work, but in such cases the supervisors must ensure that (i) industry practices are followed (ii) the students undertake a planned visit to an IT industry with international operations to make up for the loss of experienceand (iii) the services of an external guide with industry experience is obtained.

3.6 Project Management: Head of Institute/Principal of College should publish a list of students, projects topics, internal guide and external organization (if any) and teams agreed, before the end of semester 5. Changes in this list may be permitted for valid reasons and shall be considered favourably by Head of Institute/Principal of College any time before commencement of the project. Any request for change after commencement should considered by a committee of 3teachers and their recommendation shall be accepted by Head of Institute/Principal of College.

Gantt-chart of proposed activities and a draft statement of project deliverables (which may subsequently be altered if justified) should be prepared before the commencement of the project. The actual completion of each phase should be noted on the chart in the course of the project work. Students should submit a fortnightly report of progress which could be indication of percentage of completion marked on the original Gantt-chart, with any notes attached. Students should ideally keep a daily activity log sheet. Team meetings should be documented in the format given at the end. Changes in the submitted documents are possible, as project development is essentially an evolutionary process. The project guide must ensure that changes are necessary due to the knowledge gained in succeeding phases of the project. The date of completion of a phase should be brought forward if the changes made are deemed to be errors and not due to additional knowledge gained from a succeeding phase.

3.7 Documentation:

The following are the major guidelines: The final outer dimensions of the report shall be 21 cm X 30 cm. The colour of the flap cover shall be light green. Only hard binding should be done, with title of the thesis and the words "<BRIEF TITLE>BSc(CS) Project Report 200…" displayed on the spine in 20point, Bold, Times New Roman, as in example below. In case the title is too long, a shorter version of it may be used (Like "Image Pro" instead of "Image Pro – An Interactive Image Processing package"). It is highly recommended that Latex be used for documentation.

• The text of the report should be set in 12 pt, Times New Roman, Single Spaced.

• Headings should be set as follows: CHAPTER HEADINGS 20 pt, Times New Roman, Bold, All Caps, Centered.

WEB BASED BILLING SOFTWARE: BSC(CS) PROJECT 2009

1. SECTION HEADINGS 12 pt, Times New Roman, Bold, All Caps, Left Adjusted.

1.1 Section Sub-headings 12 pt, Times New Roman, Bold, Left Adjusted.

Titles of Figures, Tables etc are done in 12 point, times New Roman, Italics, Centered.

<PROJECT TITLE>

<STUDENT'S NAME>

<COLLEGE NAME>

PROJECT REPORT
Submitted in partial fulfilment of the
Requirements for the award of BSc (computer science) degree of
University of kerala
2014

Some general guidelines on documentation stylistics are:

• Double quotes and single quotes ("", ") should be used only when essential. In most cases words put in quotes are better highlighted by setting them in italics. Eg: This process is known as "morphing". This process is known as *morphing.*

• Page numbers shall be set at right hand top corner, paragraph indent shall be set as 3.

• Only single space need be left above a section or sub-section heading and no space may be left after them.

• Certificate should be in the format: "Certified that this report titled....................... is abonafide record of the project work done by Sri/Kum....................... under our supervisionand guidance, towards partial fulfilment of the requirements for the award of the Degree ofBSC (Computer Science) of the University of Kerala" with dated signatures of Internal;Guide, external guide and also Head of Institute/College.

• If the project is done in an external organization, another certificates on the letterhead of the organization is required: "Certified that his report titled.............................. is a bonafide record of the project work done by Sri/Kum............................ under any supervision and guidance, at the ....Department of.................... (Organization) towards partial fulfilment of the requirements for the award of the Degree of BSC (Computer Science) ofthe University of Kerala".

• References shall be IEEE format (see any IEEE magazine or transaction). Take care in use of italics and punctuation. While doing the project, keep note of all books you refer, in the correct format, and include them in alphabetical order in your reference list. Eg: A book is cited as: Kartalopoulos, S V Understanding Neural Networks and Fuzzy Logic, BPB Publishers, 1996, pp.

21-27. (pp.21-27 indicates that pages 21-27 have been referred. If the whole book is being referred, this may be omitted. If a single page is referred, say 7, it may be cited as p.7 Report writing is NOT a hasty activity done after finishing the project. Students must try to develop the report along with the work, so as to give it flesh and blood. Drafts should be read, modified, spell checked and grammar checked at least thrice during the course of the project and before a final printout is taken, the same may be got approved from the internal guide. The students should send two interim reports to internal guides. This will also help the students in their report writing.

The Gantt chart, fortnightly progress reports, and team meeting minutes mentioned in section 3.5 should appear as appendix to the project report. Regarding the body of the report, as an indicative Example, the following is given (though students should not attempt to fit every kind of project report into this format):
  – Organizational overview (of the client organization, where applicable)
  – Description of the present system
  – Limitations of the present system
  – The Proposed system- Its advantages and features
  – Context diagram of the proposed system.
  – Top level DFD of the proposed system with at least one additional level of Expansion
  – Structure Chart of the System
  – System flowchart
  – Menu Tree
  – Program List
  – Files or tables (for DBMS projects) list. Class names to be entered for each file in OO systems.
  – List of fields or attributes (for DBMS projects) in each file or table.
  – Program – File table that shows the files/tables used by each program and the files are read,written to, updated, queried or reports were produced from them.
  – Reports List with column headings and summary information for each report.
  – System Coding and variable/file/table naming conventions
  – System controls and standards
  – Screen layouts for each data entry screen.
  – Report formats for each report.

Program documentation is suggested on the following lines:
  – Program id
  – Program level run chart
  – Program function Explanation
  – Data entry screen (reproduced from system documentation).
  – Report layout (reproduced from system documentations)
  – Program level pseudocode or flowchart.
  – Decision tables, decision trees, with English Explanation where necessary.
  – Program listing
  – Test data
  – Test results.

3.8 Methodology:

Wherever applicable, object oriented approach should be used for software development. The project report should generally contain details of the following steps *(though students should not attempt to fit every kind ofproject into this format):*

(a) Analysis
  – Study of existing systems and its drawbacks (general)
  – Understanding the functionalities of the system (detailed)
  – Preparation of requirement
  – Conduct of Feasibility study
  – Identification of relevant Objects
  – Abstraction of each object (attributed and methods)
  – Relationship between objects

(b) Design
  – Design of each subsystems
  – Design of each classes
  – Design of communications between objects
  – Design of Algorithms for problem solving
  – User interface Design
  – Any other steps if necessary

(c) Coding and Impletion
(d) Testing
(e) Security, Backup and Recovery Mechanisms
(f) On line help and User Manuals
(g) Upgradability Possibilities

3.9 Project IPR & Utilisation: The intellectual property rights in all project work done by the students shall vest with the University of Kerala, except in cases where some external organizations seek undertaking from students to concede IPR in all work done in theirorganization or under their guidance. Where possible, students should attempt to obtain at least ajoint IPR for the University. In cases where project works are of public utility, students shall beasked to publish their work including source code and documentation, in so far as their rights areclear.

4. REFERENCES

4.1 Core
- ❖ S A Kelkar, *Software Project Management*, Prentice Hall of India
- ❖ W Alan Randolph, Barry Z. Posner, *Effective project planning and management*, PHI

  4.2 Additional

  - ▪ Greg Mandanis, *Software Project Management Kit for Dummies*, IDG Books
  - ▪ Joel Henry, *Software Project management*
  - ▪ Frederic P B, Mythical Man-month, *Essays on Software Engineering*, Addison Wesley
  - ▪ David Lamport, *Latex: A document Preparation System*, 2/e, Pearson Education