Career Related First Degree Programme in Computer Science

Scheme and Syllabus

SCHEME

1. COURSE LIST

Semester I:	Semester II

EN1111.4 Speaking and Listening skills
CS1121 Introduction to IT
MM1131.10 Mathematics – I
CS1132 Digital Electronics & Data
           Communication
CS1141 Introduction to Programming
CS1142 Programming Lab - I
CS1133 Digital Electronics Lab
	EN1211.4 Writing and Presentation Skills
	CS1221 Computer Organization and
	           Architecture
	MM1231.10 Mathematics – II
	CS1241 Data Structures
	CS1242 Object Oriented Programming
	CS1243 Programming Lab – II
	CS1244 Data Structures Lab

Semester III:	Semester IV:
CS1341 Humanities I CS1342 Software Engineering CS1343 System Software & Operating Systems CS1344 Computer Graphics CS1345 Microprocessors & Peripherals CS1346 Programming Lab III CS1347 Computer Graphics Lab	CS1441 Principles of Management CS1442 Databases CS1443 Computer Networks CS1444 Programming in Java CS1445 Minor Project & Seminar CS1446 Programming Lab – IV CS1447 Databases Lab
Second Academic Year: BSc EVS. Environmental Studies	
Semester V:	Semester VI:

CS1541 Humanities II
CS1542 Internetworking & Information
        Security
CS1543 Web Programming
CS1551 Linux Environment
CS1552 Elective- I:
    A. Artificial Intelligence
    B. Bioinformatics
    C. Algorithm Analysis and Design
CS1544 Programming Lab - V
CS1545 Linux Lab
	CS1651 IT & Society
	CS1652 Multimedia Systems
	CS1653 Business informatics & E-commerce
	CS1654 Elective - II:
	    A. Mobile Programming
	    B. Embedded Systems
	    C. Compiler Design
	CS1641 Multimedia Lab
	CS1642 Major Project & Viva

SEMESTER I

Course Code	Course Name	MINIMUM HOURS PER WEEK			
		Lecture	Tutorial	Lab	Total
EN1111.4	EN1111.4 Speaking and Listening skills	3			3
CS1121	Introduction to IT	3			3
MM1131.10	Mathematics – I	3	1		4
CS1132	Digital Electronics & Data Communication	3			3
CS1141	Introduction to Programming	3	1		4
CS1133	Digital Electronics Lab			4	4
CS1142	Programming Lab - I			4	4
	TOTAL	15	2	8	25

EN1111.4 Speaking and Listening skills

1. AIMS:

1) To familiarize students with English sounds and phonemic symbols.

2) To enhance their ability in listening and speaking.

2. OBJECTIVES:

On completion of the course, the students should be able to

- Listen to lectures, public announcements and news on TV and radio.

- Engage in telephonic conversation.

- Communicate effectively and accurately in English.

- Use spoken language for various purposes.

3. SYLLABUS

Part I: Pronunciation

Phonemic symbols – consonants – vowels –syllables - word stress - strong and weak form intonation.

Part 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.

Part 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

Part IV: Dialogue Practice

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

4. REFERENCES

4.1 Core References

Listening and Speaking: A Course for Undergraduate Students (Foundation Books)

4.2 Additional References

- 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

1. AIMS:

- *To introduce mathematical concepts and techniques that have applications in computer science field*

2. OBJECTIVES:

- *To introduce advanced differential calculus*
- *To introduce solutions of differential equations*
- *To introduce Number theory*
- *To introduce ComplEX1 Number Theory.*

3. SYLLABUS

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

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

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

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

Assignments and Activities: *Markov processes. Harmonic analysis and Fourier series, Linear Programming*

4. REFERENCES

Erwin Kreyzig, Advanced Engineering Mathematics, New Age International Pvt Ltd.

Shanthi Narayan, Differential Calculus, S Chand & Company

Zafar Ahsan, Differential Equations and their applications.

Rudra Pratap, Getting Started with MATLAB, Oxford University Press, ISBN 0-19-515014-7, Rs 275

4.3 Internet resources:

www.ams.org/mathweb

www.falstad.com/mathphysics.html

//cs.jsu.edu/mcis/faculty/leathrum/Mathlets

//archives.math.utk.edu/visual.calculus/

CS1121 Introduction to IT

1. AIMS:

• *To create overall generic awareness about scope of the field of IT and to impart basic personal computing skills.*
• *To create background knowledge for the various courses in the programme.*

2. OBJECTIVES:

• *To introduce the basic terminology in the field of IT*
• *To impart functional knowledge about PC hardware, operations and concepts*
• *To impart functional knowledge in the use of GUI Operating System*
• *To impart functional knowledge in a standard office package (word processor, spread sheet and presentation softwares) and popular utilities*
• *To impart functional knowledge about networks and internet.*
• *To give an overview of computer application in various fields and an overall generic awareness about the scope of the field of IT*

3. SYLLABUS

Module–I: **Computer characteristics**: Speed, storage, accuracy, diligence; Digital signals, Binary System, 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: Flash memory; Auxiliary storage: Magnetic devices, Optical Devices; Floppy, Hard disk, Memory stick, CD, DVD, CD-Writer; Input devices - keyboard, mouse, scanner, speech input devices, digital camera, 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 Presentation softwares; Generic Introduction to Latex for scientific typesetting; Utilities and their use; Computer Viruses & 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, cable modem, 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.

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.*

4. REFERENCES

4.1 Core References

• Alexis & Mathews Leon, *Fundamentals of Information Technology,* Leon Vikas, ISBN: 08125907890, Rs. 180

• Curtin, Foley, Sen & Martin, *Information Technology: The breaking Wave,*Tata Mc Graw Hill, Rs 195/-

4.2 Additional References

• Rajaraman, *Introduction to Information Technology*, PHI,

• Greg Perry, *SAMS Teach Yourself Open Office.org*, SAMS, ISBN 0672326183

• Alexis Leon & Mathews Leon, *Computers Today*, Leon Vikas, Rs. 180

• Ron White, *How Computers Work* (with CD), BPB, New Delhi, ISBN 81-7029-687-0

• George Beekman, Eugene Rathswohl, *Computer Confluence*, Pearson Education, ISBN 0-13-066185-6

• Peter Dyson, *The PC User's essential accessible Pocket Dictionary*, BPB, ISBN 81-7029-730-3, Rs 66/-

• Barbara Wilson, Information Technology: The Basics, Thomson Learning

• John Ray, 10 Minute Guide to Linux, PHI, ISBN 81-203-1549-9, Rs 75

• Ramesh Bangia, *Learning Computer Fundamentals*, Khanna Book Publishers, ISBN818752252b, Rs 65

• Ramesh Bangia, Learning Windows XP, Khanna Book Publishing Co, ISBN 81-87522-36-4, Rs 65

• Ramesh Bangia, Learning Power Point, Khanna Book Publishing Co, ISBN 81-87522-63-1, Rs 50

• Leslie Lamport, LatEX User Guide and Reference Manual, Indian edition, Addison Wesley.

• Brookshear, J. G. (1997), *Computer Science: An Overview*, Fifth Edition, Addison-Wesley.

• Biermann, A. W. (1990), *Great Ideas in Computer Science*, The MIT Press, Cambridge, MA

4.3 Internet resources:

• www.fgcu.edu/support/office2000

• www.openoffice.org *Open Office Official web site*

• www.microsoft.com/office *MS Office web site*

• www.lgta.org *Office on-line lessons*

• www.learnthenet.com *Web Primer*

• www.computer.org/history/timeline

• www.computerhistory.org

• www.technopark.org

• http://computer.howstuffworks.com

• http://vmoc.museophile.org *Computer History*

• www.dell.com *Dell Computers*

• www.intel.com *Intel*

• www.ibm.com *IBM*

• www.keralaitmission.org *Kerala Govt. IT Dept.*

CS1132 Digital Electronics & Data Communication

1. AIMS:

- *To impart basic knowledge in digital logic and circuits and to introduce basic concepts of data communications.*

2. OBJECTIVES:

- *To review basic electronics concepts*
- *To review data representation techniques*
- *To introduce student to basic concepts of digital logic*
- *To introduce students to the design of basic logic circuits*
- *To introduce students to some commonly used combinational and sequential circuits*

3. SYLLABUS

Module–I: **Review of Basic Electronics**: Review of basic operations of passive and active electronic components: Resistors, Capacitors, Inductors, Diodes, LEDs and Transistors, Operation of rectifiers (half and full wave), RC Coupled Feedback Amplifiers, Oscillators, Multi-vibrators, 555 timer (All the preceding topics shall be covered with stress on behaviour of component/circuit rather than internal details like semiconductor physics).

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, Floating Point 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: Minterms, SOP Expressions, Maxterms, POS Expressions; Karnaugh maps, McClarley method

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

Activities and assignments: *Miscellaneous Topics: Advances in Electronics: Evolution of Transistor Technology, Nano Technology, Molecular Electronics.*

4. REFERENCES
4.1 Core References
John R Gregg**,** Ones and Zeros, IEEE Press/PHI, ISBN 81-203-1640-1, Rs 125
{Also for Lab} K A Krishnamoorthy, Digital Lab Primer, Pearson Education, ISBN81-297-0196-0, Rs 150
4.2 Additional References
N N Bhargava, D C Kulshreshtha, S C Guptha, Basic Electronics and Linear Circuits, Tata McGraw-Hill Publishing Company Limited, New Delhi, Rs. 150
S.K,Venkita Ram, *Fundamentals of Digital Electronics and Microprocessors*, S.Chand Books, Rs. 225
Hohn D Carpinelli, *Computer Systems: Organisation and Architecture*, ISBN 81-7808268-3, Rs 295

4.3 Internet resources:

www.prenhall.com/mano
//science-ebooks.com/electronics/
//electronics.howstuffworks.com
www.twysted-pair.com/dictionary.html
www.electronics-tutorials.com
//home.att.net/~basicelectronics/
www.st-andrews.ac.uk/~www_pa/
    Scots_Guide/intro/electron.htm
//hyperphysics.phy-
    astr.gsu.edu/hbase/electronic/etroncon.ht
    ml
www.lguanalabs.com/maintut.htm
www.interq.or.jp/japan/se-inone/eparts.htm
www.wisd.net/indusrialtechnology/electronicli
nks.iitm
www.aw.com/carpinelli
www..prehall.com/wakerly

CS1141 Introduction to Programming

1. AIMS:

To Expose students to algorithmic thinking and problem solving and impart moderate skills in programming in a industry-standard programming language

2. OBJECTIVES:
- *To Expose students to algorithmic thinking and algorithmic representations*
- *To introduce students to basic data types in C.*
- *To introduce students to basic control structures in C.*
- *To introduce students to structured programming concepts*
- *To introduce students to standard library functions in C language*

3. SYLLABUS

Module–I: Introduction to programming: Algorithm & Flow charts: Definitions, Symbols used to draw flowcharts, Examples. High-level and Low-level Languages, Generations of Programming Language, Language translators: Assemblers, Compilers, Interpreters (Only concept and differences), Editor, Program Writing – Structure of the Program, top-down design, Source code, Object code, Executable file, Extensions of different files, Program Compilation, Running of a Program; Header file concept.

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

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: Multi dimensional arrays, declaration, initialization and processing; array & pointer relationship, pointer to arrays, array of pointers. Strings: String handling functions; Structures and unions; File handling: text and binary files, file operations, Library functions for file handling, bitwise operators.

Activities and assignments: Preprocessor 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.

4. References

4.1 Core References

Yashvant Kanetkar, Let us C, BPB Publications, 3rd Edition, Rs 165/-

Ashok N. Kamthane, *Programming with ANSI and Turbo C*, Pearson Education,ISBN 81-7808-585-2, Rs 195/-

4.3 Internet resources:

www.cprogramming.com
www.programmersheaven.com
comp.lang.c *newsgroup*
www.cplusplus.com
//cwx.prenhall.com/bookbind/pubbooks/deitel

CS1142 Programming Lab – I

1. AIMS:

To provide an opportunity for hands-on practice of basic features of DOS, Windows, software tools(word processor, spread sheet, presentation s/w) and algorithmic thinking and problem solving in a industry-standard programming language

2. OBJECTIVES:

After the completion of this course, the student should be able to:

- *Create, Save, Copy, Delete, Organise various types of files and manage the desk top in general*
- *Use a standard word processing package Exploiting popular features*
- *Use a standard spread-sheet processing package Exploiting popular features*
- *Use a standard presentation package Exploiting popular features*

Also, this course will provide hands-on practice in a the following topics, under a variety of programming situations with a focus on writing, debugging and analyzing structured programs:

- *basic data types in C.*
- *basic control structures in C.*
- *arrays, structures and files*
- *standard library functions in C language*
- *solving moderately complex problems involving the above and requiring selection of appropriate data structures and efficient algorithms*

3. SYLLABUS

PART I

1. Familiarization of important DOS/Windows/Linux features

2. Practice on basic features of word processor, spread sheet and presentation software.

Part II

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.
2. 1 continued
3. 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.
4. 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.

5. Structures: A variety of programs to declare, intitialise, read, print and process structures made up of a variety of data types and structures.

6. 2-D Arrays: A variety of programs to declare, intitialise, read, print and process 2-D arrays of various basic data types. Processing to include, selection, sum, counting, selective sum, selective counting, reversing etc.

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

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

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

1. 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
2. Functions –II: Declaring and using functions with pass by reference, Passing and Returning structures, Recursive functions.
3. Files: Simple Example involving use of multiple files: declaring, opening, closing, reading from and writing to text files.
4. Files: Example involving use of multiple files: declaring, opening, closing, reading from and writing to binary files.
5. Library functions: A variety of Examples demonstrating (i) string processing functions (ii) a variety of slected library functions
6. Debugging programs involving syntactic and/or logical errors

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

4. REFERENCES

Deitel & Deital, C: How to Program, Pearson Education, ISBN 81-7808-383-3, Rs 325/-

Alan R Feuer, The C Puzzle Book, Pearson Education, ISBN, 81-297-0490-0, Rs 125/-

Yashvant Kanetkar, Test Your C Skills, BPB Publications, 3rd Edition, Rs 165/-

4.3 Internet resources:

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

CS1133 Digital Electronics Lab

1. AIMS:

• *To provide hands-on practice of the basic knowledge in digital logic and circuits*

2. OBJECTIVES:

• *To provide hands-on practice basic logic circuits*

• *To provide hands-on practice in some commonly used combinational and sequential circuits*

3. SYLLABUS

The laboratory work will consist of 15 experiments

1. Study and Testing of measuring instruments: Digital and Analog multimeters, CROs and Signal Generators – 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 noise margin and fan-in/out of TTL gates*

7. *Study of Logic Gates: Determination truth table of basic gates, realization of Boolean functions, test pulse operation*

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*

4. References:

Core Reference:

K A Krishnamoorthy, Digital Lab Primer, Pearson Education, ISBN81-297-0196-0, Rs 150
Additional Reference:
K. A. Navas, Electronics lab manual Vol. I, (3rd Edition), Rajath Publishers, Eranakulam, Rs 150
5. Internet Resources:
http://www.electronics-lab.com

SEMESTER II

Course Code	Course Name	Minimum hours per week			
		Lecture	Tutorial	Lab	Total
EN1211.4	Writing and Presentation Skills	3			3
CS1221	Computer Organization and Architecture	3	1		4
MM1231.10	Mathematics – II	3	1		4
CS1241	Data Structures	3			3
CS1242	Object Oriented Programming	3			3
CS1243	Programming Lab – II			4	4
CS1244	Data Structures Lab			4	4
	TOTAL	15	2	8	25

CS1211 Writing and Presentation Skills

1. Aims:

1. To familiarize students with different modes of general and academic writing.

2. To help them master writing techniques to meet academic and professional needs

3. To introduce them to the basics of academic presentation

4. To sharpen their accuracy in writing.

2. OBJECTIVES:

On completion of the course, the students should be able to

- understand the mechanism of general and academic writing.

- recognize the different modes of writing

- improve their reference skills, take notes, refer and document data and materials

- prepare and present seminar papers and project reports effectively.

3. SYLLABUS

Part 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.

Part 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

Part 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.

Part IV: Presentation as a skill - elements of presentation strategies – audience – objectives – mediu- 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.

4. REFERENCES

4.1 CORE REFERENCES

Part I to III

 Write Rightly   A Course for Sharpening Your Writing Skills. (CUP)

 Part IV

Guide to Presentations. (by Mary Munter and Lynn Rusell. Pearson Education)

ADDITIONAL REFERENCES

Part I to III

- Robert, Barraas. Students Must Write. London: Routledge, 2006.

- Bailey, Stephen. Academic Writing. Routledge, 2006.

- Hamp-Lyons, Liz, Ben Heasley. Study Writing. 2nd Edition. Cambridge University Press, 2008.

- Ilona, Leki. Academic Writing. CUP, 1998.

- McCarter, Sam, Norman Whitby. Writing Skills. Macmillan India, 2009.

 Part IV

 Jay. *Effective Presentation*. New Delhi: Pearson, 2009.

Reference	:	Mayor, Michael, et al, Ed. *Longman Dictionary Of Contemporary English.* 5th Edition. London: Pearson Longman Ltd, 2009

MM1231.10 Mathematics II

1. AIM:

- *To introduce mathematical concepts and techniques that have applications in computer science field*

2. OBJECTIVES:

- *To introduce proof methods in mathematics and mathematical logic*
- *To review concepts and techniques of set theory, relations and functions*
- *To introduce various algebraic structures*
- *To introduce graph theory*
- *To develop an excitement in mathematics by highlighting its hidden beauty and significance*

3. SYLLABUS

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, Graph Propagation algorithm, Depth First, Breadth-first searches, Shortest Path algorithms, Directed acyclic graphs

Activities and Assignments: Graphical representations of functions, Graphical interpretation of convergence, Complex Mapping, Fractals, Grammars, Languages and Automaton. Introduction to Mathlab (Matrix, Linear Algebra, Graphics operations)

4. REFERENCES

1. V. Ramaswamy: Discrete Mathematical Structures with Applications to Combinatorics, Universities press

4.1 Core References

- Rajendra Akerkar, Rupali Akerkar, *Discrete Mathematics*, Pearson Education, ISBN 81-297-0118-9, Rs 150

4.2 Additional References

Rm Somasundaram, Discrete Mathematical structures, PHI, ISBN 81-203-2201-0, Rs 175
Calvin C. Clawson, Mathematical Mysteries, The beauty and magic of Numbers, Viva Books Pvt Ltd,, ISBN 81-7649-831-9 Rs 295
Rudra Pratap, *Getting Started with MATLAB*, Oxford University Press, ISBN 0-19-515014-7, Rs 275

4.3 Internet resources:

www.prenhall.com//goodaire,   www.ams.org/mathweb
www.falstad.com/mathphysics.html,   //cs.jsu.edu/mcis/faculty/leathrum/Mathlets

www.ealnet.com/ealsoft/fracted.htm Fractals
www.math.umass.edu/~mconnors/fractal/fractal.html
//info.lboro.ac.uk/departments/ma/gallery/index.html
www.ee.umd.edu/~yavuz/logiccalc.html logic calculator
//archives.math.utk.edu/visual.calculus/
www.utm.edu/departments/math/graph/ www.math.odu.edu/~bogacki/cgi-bin/lat.cgi
Linear Algebra Tool Kit

CS1 221 Computer Organization & Architecture

1. AIMS:

- *To impart knowledge in the functional organization of physical components and architecture of a computer.*

2. OBJECTIVES:

- *To familiarize the basic terminology of computer hardware.*
- *To understand the functional units of a standard PC.*
- *To understand the basic working of a CPU..*
- *To understand the memory organization in a computer.*
- *To explain how input/output devices are organized and managed.*
- *To introduce the concept of parallel processing and multiprocessing.*

3. SYLLABUS

- **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, fetching instructions, decoding and executing instructions, branching, design of a simple ALU, design of control unit, multiple buses in CPU, Microprogram, micro sequencer, micro subroutine, microinstruction format, design and implementation of a simple microsequencer; microcprogrammed control and hardwired control, RISC & CISC (feature-wise comparison only); Pipelining and Parallel processing, Pentium microprocessor.

- **Module–III:** Memory: memory hierarchy, speed, size, cost; RAM, ROM, internal chip organization; 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 data transfers, handshaking, programmed I/O (concept only), polling, interrupts: types of interrupts, processing interrupts, priority, interrupt hardware, ISR, daisy chaining; Direct memory access, DMA controller, transfer modes, I/O processors, serial communication, UART, standards: RS-232, USB.

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.

4. REFERENCES

4.1 Core References

- Carl Hamacher, Vranesic, Zaky, *Computer Organization* 4/e, McGraw-Hill, ISBN 0-07-114323-8
- Ramesh Bangia, *Learning PC hardware*, Khanna Publishing Co., ISBN 81-87522-11-9
- Carpinelli, John D., *Computer systems Organization & Architecture*, Pearson Education Asia, ISBN 81-7808-268-3, 2001.

4.2 Additional References

- William Stallings, Computer Organisation & Architecture, 6/e, Pearson Education, ISBN 81-7808-792-8
- Rajaraman, Radhakrishnan, *Computer Organization and Architecture,* PHI, 2007.

4.3 Internet resources:

www.aw.com/carpinelli
www.prenhall.com/mano
www.williamstallings.com/COA6e.html

CS1241 Data Structures

1. AIMS:

To introduce students to various data structures and their features and applicability.

2. OBJECTIVES:

By the end of the course, students should be:
- *Able to rite well structured programs in C*
- *Be familiar with common data structures like array, structures, lists, stacks, queues, trees and graphs*
- *Able to implement the above data structures in C/C++*
- *Able to appreciate various searching and sorting strategies*
- *Able to select appropriate data structures for solving a given problem*

3. SYLLABUS

Module–I: Concept of abstract data types, the notion that programs= algorithms + data structures, Arrays: handling of 1, 2 and 3 dimensional arrays, handling of arrays using pointers, passing arrays as arguments to functions. Structures: building complex structures – structure of arrays, array of structures, pointer to structures, passing structures as arguments to functions. Files: binary and text files.

Module–II: 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. 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, pre and post order), operations on a tree –insertion, deletion and processing, expression trees, implementation using pointers, applications.

Module–IV: Efficiency considerations, O notation**,** best case, worst case and average cases, Searching: sequential searching, binary searching, Graphs, graph traversal- depth-first and bredth-first traversal of graphs, applications.

Assignments and Activities : *Hashing – linear hashing, hash functions, hash table searching, Sorting: exchange sort, selection sort and insertion sort., Multi-way search trees, B-trees, Huffman trees, case studies.*

4. REFERENCES

4.1 Core References

1. Ellis Horowitz Sartaj Sahni **etc.,** Fundamentals of Data Structures in C++ , University Press Second edition.

2 D. Samanta, Classic Data Structures, Prentice Hall of India,978-81-203-1874-8,Rs.225.

3. Yedidyah Langsam, Moshe J. Augustein, Aaron M. Tenenbaum, Data Structures using C and C++, 2/e, ISBN 81-7808-729-4, Pearson Education (Indian Edition), Rs 250/-

4.2 Additional References

• Nair A.S., Makhalekshmi, Data Structures in C, PHI, 2008.

• S K Bandyopadhyay, K N Dey, *Data Structures Using C*, ISBN 81-297-0326-2, Pearson Education, Rs 150/-

• Ashok N Kamthane, Introduction to Data Structures in C, Pearson, ISBN 81-297-0643-1, Rs 195/-

• Ken Brownsey, The essence of data structures using C++, Pearson Education, ISBN 81-297-0682-2, Rs 150/-

• Sarjat Sahni, Data Structures , Algorithms and Applications in Java, University Press Second edition

4.3 Internet resources:

www.keralauniversity.edu/csbos

http://warrior-101.tripod.com/dstut/dstut.html : Tutorial on data structures.

http://crasseux.com/books/ctutorial/Data-structures.html

CS1242 Object Oriented Programming

1. AIMS:

• *To introduce the student to the basic concepts of object orientation and impart skills in an industry standard object oriented language*

2. OBJECTIVES:

On the completion of this course, the student will be able to

• **Understand the concepts of classes and object**
• **Define classes for a given situation and instantiate objects for specific problem solving**
• **Reuse available classes after modifications if possible**
• **Possess skill in object oriented thought process**

3. 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, message passing. Advantages of object orientation – reusability, maintenance, security, comfort in programming. 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.

Assignments and activities: 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.

4. REFERENCES

4.1 Core References
• NIIT, *C++: Programming Fundamentals*, Prentice Hall of India,
• Robert Lafore, *Object Oriented programming with C++,* PHI

4.2 Additional References
• Ashok N. Kamthane, *Object oriented Programming with ANSI & Turbo C++*, Pearson Education, ISBN 81-7808-722-3, Rs 225/-
• H M Deitel and P J Deitel, C++: how to program, Pearson Education, ISBN 81-297-0276-2, Rs450/-
• Bruce Eckel, Thinking in C++, 2/e, Vol. 1, Pearson Education, ISBN 8-178-08297-7, Rs 495/-

- Robert Lafore, Object Oriented Programming in Turbo C++, Galgotia Publications Pvt Ltd, Rs 279/-
- Yaswant Kanetkar , Let Us C++,BPB Publications
- Bjarne Stroustrup, The C++ Programming Language, Addison Wesley Publishin Company, New York,1994
- Herbert Schildt , Teach Yours self C++, Osborne, 1994
- Patrick H Winston, On to C++, Pearson Education, ISBN 981-235-922-2, Rs 195/-

4.3 Internet resources:

www.deitel.com, www.prenhall.com/deitel, www.InfromIT.com/deitel, www.cplusplus.com, www.zib.de/Visual/people/mueller/ Course/Tutorial/tutorial.html, www.linuxgazette.com/ issue55/williams.html, http://www.clark.net/pub/howie/OO/oo-home.html

CS1243 Programming Lab – II

1. AIMS:

To provide an opportunity for hands-on practice of object oriented programming and problem solving in a industry-standard programming language and also hands-on practice in various user-defined static and dynamic data structures.

2. OBJECTIVES:

This course will provide hands-on practice in a the following topics, under a variety of programming situations with a focus on writing, debugging and analyzing object oriented programs:

* *basic data types and control structures in C++.*
* *managing classes and objects in a variety of situations*
* *solving moderately complex problems involving the above and requiring selection of appropriate structures and algorithms*

3. SYLLABUS

The 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.
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 the contrast between the two methods, for example declaring result of a set of students defining the name and total marks in the program itself).

3. Class definitions and usage involving variety of constructors and destructors
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 selected library functions
11. exception handling
12. Handling of 2-D arrays using pointers
13. Debugging programs involving syntactic and/or logical errors

4. REFERENCES

Deitel N M, C++: How to Program, Lab Manual, ISBN 0-131-4099-9
Deitel & Deital, C++: How to Program, Pearson Education, ISBN 81-297-0276-2

4.3 Internet resources:

www.cplusplus.com

CS1244 Data Structures Lab

1. AIMS:

To provide an opportunity for hands-on practice on different algorithms using various data structures.

2. OBJECTIVES:

This course will provide hands-on practice in all the following topics, using either C or C++:

- *Stack and queues*
- *managing both singly and doubly linked list*
- *different trees, construction and traversal*
- *Searching and sorting*

3. SYLLABUS

The laboratory work will consist of 15-20 experiments like

- Linked list operations: traversal, node deletion, node insertion in singly, doubly and circular lists
- 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
- Searching using hash tables
- Graph traversal
- Implementation of different searching techniques
- Implementation of different sorting techniques

SEMESTER III

Course Code	Course Name	Minimum hours per week			
		Lecture	Tutorial	Lab	Total
CS1341	Humanities I	3			3
CS1342	Software Engineering	3			3
CS1343	System Software & Operating Systems	3	1		4
CS1344	Computer Graphics	3			3
CS1345	Microprocessors & Peripherals	3	1		4
CS1346	Programming Lab III			4	4
CS1347	Computer Graphics Lab			4	4
	TOTAL	15	2	8	25

CS1341 Humanities I

1. AIMS:

- *To create an interdisciplinary perspective*
- *To create general awareness about humanities*
- *To impart necessary basic knowledge for futuristic technologies and applications which hinge on humanities.*

2. OBJECTIVES:

- *To introduce students to basic concepts, scope, nature and methods of Sociology, Political Sciences, Law, Education and Logic.*

3. SYLLABUS

Module–I: Introduction to Sociology: Definition, scope, nature, schools of sociology, methods of sociology, society, social structure, social institutions, social control, social change.
Module–II: Introduction to Political Sciences: Introduction to Political Theory : Nature of State, Brief introduction to western and Indian political thoughts, Legal and political sovereignty, Totalitarianism ; Political Organisation: Organisation of Govt., Organs of Govt, Representation.
Module–III : Introduction to Law: Definition, nature and functions of Law; Ideas of Legal Systems, Indian Legal system; Legal, Legislative, Judicial and Administrative Processes; Legal Materials;
Module–IV:
Module–V: Introduction to Logic: Basic Logical concepts, Analysing arguments, solving problems using logic, logic in everyday life

4. REFERENCES

4.1 Core References

- G.V. Reddy, *Sociology-I: General Principles*, Sujatha Law Books, Hyderabad, [Rs 50]]
- G.V. Reddy, *Political Science-I: Political Theory and Organisatio1n*, Sujatha Law Books, Hyderabad, [Rs 60]
- A Gopinatha Pillai & S Lekshmi, *Introduction to Legal Process*, VJL Publications, Thiruvananthapuram, [Rs 55]
- Irving M Copi & Carl Cohen, Introduction to Logic (Ch. 1-4 only), Pearson Education, ISBN 81-7808-486-4,

4.2 Additional References

- Martin Albrow; Sociology: The Basics (Third Edition), Foundation Books, ISBN 0-415-17264-0; [Rs 295]
- D.P. Mukerji, Basic Concepts in Sociology, Rupa, ISBN 81-291-0343-5 [Rs 195]
- John Seely, Law in Everyday Life; Oxford University Press; ISBN 019566939-8 [Rs 145]
- R L Trask, Language: The Basics (Second Edition), Foundation Books, ISBN 0-415-20089-X; [Rs 295]

CS1342 Software Engineering

1. **AIM:**

To enable the students to have a thorough understanding of the activities in development projects using (a) Structured Analysis and Design and (b) Object Oriented Analysis and Design

2. **OBJECTIVES:**

At the end of the course, the students should be able to :
- *Appreciate the importance of having a process for software development.*
- *Understand the various activities undertaken for a software development project following the Function oriented Design & Object oriented design*
- *Understand the issues in code design and development*
- *Test software developed using SSAD and OOAD methodologies.*
- *Have in depth knowledge about the different OOAD Themes and compare them with SSAD*

3. **SYLLABUS:**

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, timeboxing 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 for SRS, Characteristics of an SRS, Components of an SRS, Specification Languages, Structure of a Requirements 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, strucutred 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- control-flow based and data-flow based testing, test plan, test case specifications, defect logging and tracking, Comparison of Different Techniques.

Activities and Assignments*: Preparing various documents, case studies, prepreing test plans, UML diagrams, Metrics for various development phases, Agile Programming Methodologies, extreme Programming, Formal Methods, CASE Tools.*

4. REFERENCES:
4.1 Core Reference
Rajib Mall, *Fundamentals of Software Engineering,* Second Edition, Prentice Hall of India, ISBN 81-203-2445-5, Rs. 195/-

Pankaj Jalote**,** *An Integrated Approach to Software Engineering***,** Narosa Publishing House, ISBN 81-7319-271-5, Rs. 295/- (This book covers almost every topic in the syllabus in a concise manner.)

4.2 Additional References:
K.L. James, Software Engineering, Prentice Hall of India, 2009.

Roger S. Pressman, Software Engineering – A Practitioner's Approach, Fourth Edition, McGraw Hill Companies, Inc., **ISBN:** 0-07-052182-4, Rs. 415/- (Covers almost every topic in the syllabus comprehensively)

Meilir Page Jones, The Practical Guide to Structured Systems Design, Second Edition

Prentice Hall of India,ISBN: 81-203-1482-4, Rs. 195/- (This book covers Architectural Design in detail. Separate chapters on Coupling, Cohesion and Structure Chart. **)**

Martin Fowler, UML Distilled, Third Edition, Addison-Wesley, ISBN: 0-321-19368-7, ($34.99) - *covers UML 2.0*

Jeffrey A. Hoffer, Joey F. George, Joseph S. Valacich, Modern Systems Analysis and Design, Pearson Education Inc., ISBN: 81-7808-781-2, Rs. 350/- *This book has large number of examples, exercises and case studies.*

Grady Booch, Object Oriented Analysis and Design with Applications, Addison-Wesley

ISBN**:** 981-235-981-8, Rs. 447/- *The Chapter "Object Model" discusses all the OO Themes in detail*

Grady Booch, James Rumbaugh, Ivar Jacobson, The Unified Modeling Language User Guide, Addison-Wesley **,** ISBN: 981-4053-31-7, Rs.402/- (Comprehensive book on UML)

Frederick P. Brooks, Jr., The Mythical Man Month, Addison-Wesley, ISBN: 0-201-83595-9 Rs.535/- This book deals with Project Management.

Kent Beck, extreme Programming explained, Pearson Education Inc.,ISBN: 81-7808-667-0, Rs. 195/-

Journals and Magazines: (*i***)** Software Development, CMP Media. (ii) Software Quality Professional, ASQ.

4. Web Resources:
• http://courses.cs.vt.edu/csonline/SE/Lessons/ Intro and a comparison of the procedural and OO

• http://www.omg.org/gettingstarted/what_is_uml.htm This article gives an introduction to UML

• http://www-106.ibm.com/developerworks/java/library/co-design5.html tutorial introduction to Use Cases.

• http://www-106.ibm.com/developerworks/java/library/j-jmod0508/ introduction to Sequence Diagrams.

• www.rspa.com Over 1000 Software Engineering Resources on a variety of Software Engineering Topics.

• http://www.math-cs.gordon.edu/local/courses/cs211/ATM example/ A complete example OO Analysis, Design and Programming applied to a moderate size problem: simulation of an Automated Teller Machine.

CS1343 System Software and Operating Systems

1. AIMS:

To introduce students to basic functions and the theoretical underpinnings of modern operating systems

2. OBJECTIVES:

To introduce students to:

- *Fundamental concepts of systems software*
- *Functions of operating systems as a resource manager*
- *Strategies for constrained resource allocation*
- *Strategies for process scheduling*
- *Memory and I/O Management techniques*
- *Salient features of popular operating systems.*

SYLLABUS

Module I: **System Software:** Definition, components of system software – operating system,language translators, loaders (basic functions), Linkers (basic functions), interpreters. Compilers: overview of compilation process, scanning, parsing, storage allocation, compilation of expressions, compilation of control structures, code optimization. Software tools: library routines, text editors, program generators, debugging tools.

Operating system as the main component of system software; OS as a resource manager, Structure of OS- shell, utilities, resource management routines, kernel, evolution of OS, multiprogramming, time sharing, real-time systems, paralel systems, distributed systems, OS functions, Characteristics of modern OS;

Module II : **Process Management:** Process description and control: process control block, Process states: operations on processes; concurrent process; threads; processes and threads; symmetric multiprocessing; micro Kernels. CPU Scheduling: Schedulers, Scheduling methodology , CPU Scheduling algorithms, performance comparison.

Process synchronization- independent and concurrent processes, critical section, mutual Cclusion, Petersons solution, semaphore, classical synchronization problem-bounded buffer and reader/writer problem. Concept of interprocess communication.

Deadlock- deadlock and starvation, conditions for deadlock,resource alloation problem, methods for handling deadlock-deadlock prevention, deadlock avoidance- Bankers algorithm, deadlock detection, 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 paing,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 strucure & implementation, directory implementation, allocation methods, free space management.

Assignments and activities: case study of popular Operating Systems- MS DOS, UNIX, Windows 2000, *Windows NT, Linux, Sun OS, Solaris. Process managenent –Windows, Linux,Solaris. Concurrency management - Windows, Linux, Solaris. Memory management - Windows, Linux, Solaris.*

Core reference:

Balakrishna Prasad, *Operating Systems & Sytems Programming* –SciTech Publishers, ISBN 81-88429-37-6, Rs 210.

NIIT, Introduction to Operating Systems , PHI

4.2 Additional References

Pramod Chandra P Bhatt, An Introduction to Operating Systems, PHI, ISBN 81-203-2306-8, Rs 275/-

Michael Palmer et al., Guide to Operating Systems (2nd Ed), Vikas Publishing House, ISBN 981-243-117-9, Rs 450; *{Hands on knowledge and projects in DOS, Windows, Win Server, Win NT, UNIX etc.}*

Colin Ritchie, Operating Systems, BPB, ISBN 81-7029-642-0; Rs 120 {Question-answer style}

Abraham Silberschatz, Peter Baer Galvin, Greg Gagne Operating System Principles

Operating Systems – Schaum Outline Series

4.3 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

CS1344 Computer Graphics

1. AIMS:

To introduce basic theoretical underpinnings and concepts behind computer graphics and EXpose student to algorithms, tools and techniques for implementing the same.

2. OBJECTIVES:

On completion of this course, students should be able to:
- handle basic graphic primitives in C/C++ for developing 2D and 3D graphics
- program basic scan-conversion algorithms
- apply various transformations to 2D and 3D graphic objects
- derive various projections of 3D objects
- give realistic rendering to 3D wireframe objects
- be familiar with current trends in computer graphics

3. SYLLABUS

Module –I: Display technologies – Raster scan and random scan, CRTs, Color Monitors, Flat panel displays, plotters, VRAM, VGA/SVGA resolutions, Hard copy devices, Input Devices: Digitising tablets, Mouse, data glove, light pen, Touch panels, Image scanners. Review of mathematics for computer graphics: co-ordinate geometry, equations, of line, circle and their parametric forms, intersections, matrices: multiplication, transpose and inverse.

Module-II: Drawing algorithms: Line: DDA and Bresenham algorithms, Circle: Bresenham algorithm, Ellipse, antialiasing, Filling algorithms Curvedrawing: parametric representation, Bezier and B-splines, 2D transformations: translation, scaling, rotation, shearing, reflection, homogeneous coordinate system, composite transformation, inverse transformations. Zooming and panning, rubber band lines and dragging, Clipping: Window & Viewport, Sutherland line clipping algorithm.

Module –III: 3D Graphics: Creating 3D effect on 2D screens, Wireframe models – representation using vertex and edge lists, projections: Orthographic and perspective, 3D Transformations: translation, scaling, rotation, shearing, reflection, composite transformation, inverse transformations. Hidden surface removal: image space and object space categorization, computing surface normals, Back face removal method, Z-buffer method

Module IV: Illumination and Shading: Principles of illumination, Shading: constant, Gourad and Phong shading, shadow, concept of colors, color models- RGB, CMYK, HSV models. Tweening, Morphing, Warping

Assignments and activities: *Graphics in Linux, Font geometry: representation of fonts, bitmapped and vector. Introduction to Graphic Standards, Open GL and GKS, Virtual Reality Mark-up Language.*

4. REFERENCES

1.Shalini Govil-Pai : Principles of Computer Graphics, Theory and Pracrice Using Open GL and Maya, Springer International Edition.

4.1 Core References

Malay K. Pakhira, *Computer Graphics Multimedia and Animation,* PHI, 2008.

Chennakesava R Alavala ,Computer Graphics, PHI,2009

4.2 Additional References:

D P Mukherjee, Fundamentals of Computer Graphics and Multimedia, PHI, ISBN 81-203-1446-8, Rs 125/-

Peter Cooley, The Essence of Computer Graphics, Pearson Education, ISBN 81-297-0681-4, Rs 125/-

Donald Hearn, M. Pauline Baker, *Computer Graphics (C Version) 2/e,* Pearson, ISBN 81-7808-794-4, Rs 425/-

James Foley, Andries van Dam, Steven Feiner and John Hughes, Computer Graphics Principles and Practice, 2/e Pearson Education, ISBN 81-7808-038-9, Rs 450/-

Mark Giambruno, 3D Graphics and Animation, 2/e, Pearson Education, ISBN 8-1780 − 8860-6, Rs 395/-

4.3 Internet resources:

www.prenhall.com/hearn,www.prenhall.com/bookbind/pubbooks/hill4
www.povray.org ray tracing and 3D morphing,   www.cs.unc.edu/~pxpl/home.html
www.cs.utEXas.edu/users/naylor/courses/Graphics.ppt
www.cs.brown.edu/courses/cs123/lectures.shtml : A collection of presentations on all topics
http://visservices.npaci.edu/courses/maya/History-of-graphics.ppt : history of computer graphics
www.thefreesite.com/Free_Software/Graphics_freeware/: free graphics software.

CS1345 Microprocessors & Peripherals

1. AIMS:

To introduce 80x86 assembly language and thereby familiarize the student with architecture of microprocessors

2. OBJECTIVES:

By the end of the course, students should be able :
- Appreciate architectural features of of x86 family of processors
- Read and write moderately complex assembly programs for 8086 processor
- Use the tools debug, TASM/MASM, Unix/Linux Codeview
- Use assembly routines in C/C++

3. SYLLABUS

Module–I: **Introduction 8086 Architecture**: IBM PC Hardware Architecture; 8086 Regsiters, Bus, RAM organization, VRAM, Segment-Offset addressing, Fetch Decode Execute Cycle, 80x86 features, 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

Assignments and activities: Miscallaneous Topics:. Features of Pentium, Pentium MMX, Itanium Processors, RISC, CISC, Motherboard of IBM PC, Drives, Peripherals, I/O buses, Parallel, Serial and USB ports.

4. REFERENCES

4.1 Core References

N. Mathivanan, *Microprocessors, PC Hardware & Interfacing*, PH(India), ISBN 81-203-2317-3, Rs 295/-

4.2 Additional References

V Rajaraman & T Radhakrishnan, Essential assembly Language Programming for the IBM PC, PHI, ISBN 81-203-1425-5, [Rs 125]

William B Jones, Assembly Language Programming for the IBM PC Family (w/CD), Dreamtech Press, ISBN 81-7722-197-3, [Rs 399]

Peter Abel, IBM PC Assemble language Programming, **5/e,** Pearson Education, ISBN 81-7808-502-X, Rs 195/-

Steven Holzner, C With assembly language, ISBN 81-7029-122-4, BPB publications,

Walter A. Triebel, The 8088 and 8086 Microiprocessors, 4/e, Pearson Education, ISBN 81-297-0298-3, Rs 350/-

Douglas V Hall, Microprocessors: Interfacing, Programming and Hardware, Tata McGrawHill, Rs 275/-

Kenneth J Ayala, The 8086 microprocessor:Programming & Interfacing the PC, Penram International(India),Rs 285

4.3 Internet resources:

www.semizone.com, www3.itu.edu/~annebery/mini.html, www.play-hookey.com/digital, www.wisd.net/ industrialtechnology/ELECTRONICLINKS.IITM

CS1346 Programming Lab - III

1. AIMS: *To give hands-on Exposure to 80x86 assembly language*

2. OBJECTIVES:

In this course, students shall:
- Practice to use assembly language development tools like debug, TASM/MASM, Unix/Linux Codeview
- Practice majority of 8086 instruction set through simple Examples
- Develop moderately complex assembly programs for 8086 processor
- Develop assembly routines in C/C++

3. SYLLABUS

The laboratory work will consist of 15-20 Experiments

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 in segment 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 the output

(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 the byte 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. Dump this 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 locatiuon 0040:0063. Find this using Debug.

(e) ROM BIOS specifies character attributes as a byte in the following way (you have already had an occassion to learn this in Pract. 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 backlground
Rest	Upto our choice.

3-10. For each 8086 instruction, write simple Examples covering different possible cases and use T option 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 byte array.

(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) What is the forward reference problem in assemblers? How do you tackle it 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 ascci 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) 8. 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 a report of the program run time using a function called setclock( ) which returns the current time as an integer. By setting the clock at two points in a program, it should be possible to calculate the time difference.

16. (a) Using interrupt 19H. reboot the computer (b) Write an assembly program to test the printer by printing all alphabets and numerals using INT 21H, service 5H.(c) Using Int 11h, write a program to find out the number of floppy drives in the system and display the same, blinking, at the centre of the screen.

17 -20: Assembly programs which involve non-trivial logic (Program to implement modulo-n-counter for given delay, hexadecimal up-down counter, find sum of n natural numbers, find largest/smallest of n given numbers etc).

Optional: Interfacing Experiments (generating sine and square waves and interfacing a cro to view them, interfacing a seven segment display etc).

4. REFERENCES

Same as for CS1345

CS1347 Computer Graphics Lab

1. AIMS:

To provide hands-on Exposure to tools, techniques and algorithms in computer graphics

2. OBJECTIVES:

In this course, students shall:
- implement basic scan-conversion algorithms
- implement clipping algorithms
- implement various transformations to 2D and 3D graphic objects
- implement orthographic and perspective projections of 3D objects
- create 3D wireframe objects
- remove hidden surfaces of wireframe models
- implement a shading algorithm on a wireframe object

3. SYLLABUS

The laboratory work will consist of 10-15 Experiments (Questions of the type given in core reference 2 , Peter Cooley, are suggested for adoption).

1. Handling VRAM through assembly/C, implementing a plot(x,y,intensity) function
2. Implementing DDA & Bresenham algorithm for line drawing, effecting different line styles
3. Implementing circle drawing algorithms, drawing ellipses and sectors
4. Implementing Windowing and Clipping algorithms
5. Representing 2D object data files (containing vertex and edge lists) and implementing programs which read and plot these objects.
6. 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)
7. Implementing composite transformations (modification on the above, program prompts for number of transformations, accepts parameters for each and then plots all stages of transformations in different colors
8. Implementing a filling algorithm, reading the object from data file
9. Representing 3D object data files (containing vertex and edge lists) and implementing programs which read and plot the orthographic projections on the specified standard planes..
10. Program to create wireframe model of a sphere and create a data file from it(containing vertex and edge lists) and plot orthographic projection of it.
11. 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)
12. Implementing hidden surface removal by surface normal computation: to be tried out on a cube and/or a sphere
13. Implementing shading using Lambert's method (along with hidden surface removal) by surface normal computation : to be tried out on a cube and/or a sphere
14. 13 Cont'd
15. Program to produce tween between two given line segments

4. REFERENCES

Malay K. Pakhira, *Computer Graphics Multimedia and Animation,* PHI, 2008.

D P Mukherjee, Fundamentals of Computer Graphics and Multimedia, Prentice Hall of India, ISBN 81-203-1446-8, Rs 125/-

Peter Cooley, The Essence of Computer Graphics, Pearson Education, ISBN 81-297-0681-4, Rs 125/-

BSC EVS Environmental Studies

1. AIMS:

To create better understanding about the deteriorating condition of our environment among students

2. OBJECTIVES:

On completion this course, student should:
- *Have better awareness and concern about current environmental issues*
- *Develop a healthy respect and sensitivity to environment*
- *Develop pride in social and environmental activism.*

3. SYLLABUS

Module–I: The Multi-disciplinary Nature of Environmental Studies: Definition, scope and importance, Need for Public Awareness

Module –II: Ecology and Ecosystems: Definition of Ecology, Structure and function of an ecosystem, Producers, Consumers and Decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids, Inroduction, types, characteristics features and function of – forest ecosystem, grassland ecosystem, desert ecosystem, aquatic ecosystem(ponds, streams, lakes, rivers, oceans, estuaries)

Module-III: Biodiversity and its conservation: Introduction, genetic, species and ecosystem diversity definition, value of biodiversity, biodiversity at global, national and local levels, India as a mega diversity nation, hot spots of biodiversity, threats to biodiversity – habitat lose, poaching of wild life, man wild life conflicts, endangered and endemic species of India, conservation of bio diversity in in-situ EX-situ

Module-IV Natural Resources: Air resources-features, composition, structure, air quality management, forest resources-, water resources, mineral resources, food resources, energy resources, land resources

Module –V: Environmental pollution: definition, air pollution, water pollution, marine pollution, thermal pollution, soil pollution, noise pollution, nuclear hazards, waste management, cleaner technologies, reuse and recycling, solid waste management, role of individuals to prevent pollution, pollution case studies, disaster management – floods, earthquake, cyclone and landslides

Module –VI: Social issues and the environment: From unsustainable to sustainable development, urban problems related to energy, water conservation, rain water harvesting, water shed management, resettlement and rehabilitation of people- it's problems and concerns, case studies, environmental ethics- environmental value relation ships, environmental ethics and species preservation, climate change, global warming, acid rain, Ozone layer depletion, nuclear accidents and holocaust, case studies, waste land reclamation, consumerism and waste products, legislation to protect the environment, environmental protection act, ir(prevention and control of pollution) act, water(prevention and control of pollution) act, wild life protection act, forest conservation act, environmental management systems(EMS), environmental information systems(EIS), P.I.L public hearing and role of NGOS, ISO 9000 and 14000, issues involved in enforcement of environmental legislation, public awareness, environmental economics-environment and standard of living

Module –VII: Human population and the environment: Population growth, variation among nations, Population Explosion, family welfare programme, environment and human health, human

rights, value education, HIV/AIDS, women and child welfare, role of information technology in environment and human health, case studies.

Module –VIII: Field work: Visit to a local area to document environmental assets-river/ forest/grassland/ hill/ mountain, visit to a local pollution site-urban/rural/industrial/agriculture etc, study of common plants, insects, birds, study of simple ecosystems like pond, river, hill slopes etc, Organising class seminars in which students make presentations on environmental issues, Organising institutional level seminars inviting External Experts, Organising poster campaigns on selected issues, Organising Exhibitions on selected issues, Organising mass petitions, Planting trees, Ensuring that the campus is plastic-free/drug free

4. Readings

Kiran B Chokkas and others : "Understanding Environment", Sage 2004
P. Venugopala Rao, Environmental Science & Engineering, PHI
Benny Joseph: Environmental Studies, Tata Mc Graw Hill
Lester R Brown, Plan B: rescuing a Planet under stress and a civilization in trouble, Orient Longman, ISBN 81-250-2691-6, Rs 330/-
Kurien Joseph & R Nagendran, Essentials of Environmental Studies, Pearson ISBN 81-297-0489-6, Rs 225/-

5. Internet Resources

http://www.cseindia.org - Environment
http://www.panda.org - Wildlife Conservation Site
http://www.downtoearth.org/, http://www.earth-policy.org/
http://www.earthsummitwatch.org/,   http://www.foodfirst.org/
http://ecosys.drdr.virginia.edu/ - WWW Virtual Library: Environment
http://www.digitaldivide.org/ - DigitalDivide
http://www.cpsr.org/home - CPSR: Computer Professionals for Social Responsibility
http://www.awc-hq.org/ - The Association for Women in Computing

SEMESTER IV

Course Code	Course Name	Minimum hours per week			
		Lecture	Tutorial	Lab	Total
CS1441	Principles of Management	3			3
CS1442	Databases	3			3
CS1443	Computer Networks	3	1		4
CS1444	Programming in Java	3			3
CS1445	Minor Project & Seminar		1	3	4
CS1446	Programming Lab – IV			4	4
CS1447	Databases Lab			4	4
	TOTAL	12	2	11	25

CS1441 Principles of Management

1. AIMS:

To introduce the students to basic principles of management a provide an overview of its practice in the global industries.

2. OBJECTIVES:

To introduce students to:
- *Concept of Management and Organisations*
- *Planning and decision making strategies*
- *Concepts of organizational behavious and HR management*
- *Leadership qualities*

3. SYLLABUS

Module 1: Definition of Management – evolution of management principles - styles of Management – levels in management-structured and unstructured decision making – functions of management.
Organizational behaviour – motivational theories

Module 2: Production & Marketing Management: Time management–workflow design – scheduling CP/M – critical path – PERT, Problems

Types of Markets – Marketing Mix – Product life cycle – pricing strategies – advertisement-sales promotion

Module 3: Finance Management : Accounting Principles – P and L account balance sheet – NPV analysis – 'benefit cost' ratio, project evaluation – Cost analysis fixed cost variable cost- break even analysis– contribution – Marginal cost-   marginal revenues

Module 4: Human Resource Management : Meaning of HRM, Recruitment- selection and training – difference between training and development – on the job and off the job training.

Assignments and activities: Current trends and issues: Globalisation, diversity, IT, Quality Management. Organisational Culture & Environment; Managing in a global environment, understanding the global environment, managerial ethics.

4. REFERENCES

4.1 Core References

PC Tripathi and P N Reddy, Principles of management, 2/e, Tata Mc Graw Hill, ISBN 0-07-460440-6, Rs 130/-

4.2 Additional References

Stephen P Robins & Mary Coulter, Management, Pearson Education, ISBN 81-7808-649-2, Rs 325/-

E H McGrath, Basic Managerial Skills for All, Prentice Hall of India, ISBN 81-203-2180-4, Rs 295/-

4.3 Internet resources:

www.prenhall.com/robbins

CS1442 Databases

1. AIMS:

To introduce basic concepts of data bases, and related techniques and tools

2. OBJECTIVES:

- *Be aware of basic concepts of data bases and data base management systems*

- *Be aware of concepts of relational data bases.*

- *Know to normalize relational data bases*

- *Skilled in using relational algebra and relational calculus*

- *Develop skills to write database queries*

3. SYLLABUS

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.

Assignments and activities: Study of features of MS Access, Open Office Base, Oracle, mySQL, emerging areas.

4. REFERENCES

4.1 Core References

Ramon A. Mata-toledo and Pauline K. Cushman, *Fundamentals of Relational Data Bases*, Schaum Outlines, Tata McGraw Hill,   ISBN 0-07-047374-9, Rs 175/-

Paneerselvam R., *Database Management Systems*, Prentice Hall of India

4.2 Additional References

Atul Kahate, Introduction to Data Base Management Systems, Pearson Education, ISBN 81-297-0513-3, Rs 250/-

Hector Garcia-Molina, J D Ullman, & Jennifer Widom, Database Systems: The Complete Book, Pearson Education, ISBN 81-297-0378-5, Rs 495/-

4.3 Internet resources:

www.pearson.co.in/AtulKahate,
www.edugrid.ac.in/webfolder/courses/dbms/dbms_indEX.htm

CS1443 Computer Networks

1. AIM:

To introduce computer networks and through knowledge of data communication networks, their structures, techniques as well as some common standards.

2. OBJECTIVES:

On completion of this course student shall:
- *Be aware of evolution of development of networks*
- *understand the basic transmission technologies and characteristics*
- *understand the use of layer architecture for networking systems*
- *understand the main link access protocols used in local networks and their performance characteristics*
- *understand the main design issues of transport protocols and the mechanism to control traffic flow and congestion.*

3. SYLLABUS

Module I Introduction to networks – Growth of networks – Data Communication – Data flow-simplex, Half duplex ,Full duplex- Type of Connection – Point –to-Ponit, multidrop. LAN-WAN-Topology. Bandwidth- bit rate, baud rate. Transmission media – Copper wires, fiberoptics, Radio transmission, microwave, Satellite. Transmission modes- parallel , serial- Synchronous, Asynchronous- RS232- modulation-multiplexing-modem- swithching-circuit,packet,messege.

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- Noiseless and 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, concepts of congestion control-leaky bucket alorithm. TCP, UDP, DNS, Concept of Client –server interaction – remote login, Email,file transfer protocols – FTP,POP3, SMTP.

Assignments and activities: Practical networking- networking in LINUX, Peer- to- peer networking, Measurement and packet analysis, blue tooth, emerging topics (Flexi Module : Not included in End Semester Assessment)

4. REFERENCES

4.1 Core References

Brijendra Singh, Data Communication and Computer Networks 2/e, PHI

4.2 Additional References

Douglas E Comer, Computer Networks and Internets, 4/e, Pearson Education, ISBN 81-297-0330-0, Rs 325/-

Douglas E Comer, Hands-on Networking with Internet Technologies: A Lab Manual, Pearson Education, ISBN 81-7808-786-3, Rs 150/-

Andrew S. Tanenbaum, Computer Networks, 4/e, Pearson Education, ISBN 81-7808-785-5, Rs 250/-

4.3 Internet resources:

www.netbook.cs.purdue.edu, www.labbook.cs.purdue.edu,
www.edugrid.ac.in/webfolder/courses/cn/cn_indEX.htm

CS1444 Programming in Java

1. AIMS:

To introduce students to basic features of Java language and selected APIs

2. OBJECTIVES:
- *Let students install and work with JDK, also make them aware the use of java doc.*
- *Practice basic data types, operators and control structures in Java*
- *Practice basic handling of classes and objects in Java*
- *Introduce the following selected APIs: I/O, Strings, Threads, AWT, Applet, Networking*
- *Idea to approach and use a new package*

3. SYLLABUS

Module–I: A simple Java Application, a simple Java Applet , 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, Finalizers, Classes inside classes : composition

Module-II: Inheritance & Interface, Deriving Classes, Method Over-riding, Method Over-loading, 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

Module V: Network Programming, IP Address & Port Numbers, URLs, Client & Server Concept, Port & Socket, Server Socket, Simple Server And Client program, miscallaneous Topics: Parameters in Applets, JavaBeans, JDBC, RMI

4. REFERENCES

4.1 Core References
Java: Foundations of Programming, NIIT/ PHI, Rs 195/-.
Java Programming, *Schaum Outline Series*

4.2 Additional References
Deitel, Java: How To Program, Pearson Education, ISBN 81-2970-488-9, Rs 495/-
Bruce Eckel, Thinking in Java, Education, ISBN 81-2970-524-9, Rs 550/- (Also freely downloadable)
Debasish Jana,*Java and Object-Oriented Programming Paradigm.*
Radha Krishna P ,Object –Oriented Programming through JAVA, University Press
Jerry R Jackson & Alan L McClellan , Java By Example, Sunsoft (Prentice Hall)

4.3 Internet resources:
www.edugrid.ac.in/webfolder/courses/java/java_indEX.htm

http://javaboutique.internet.com/articles/ITJqanda/
http://java.sun.com/
http://sunsite.unc.edu/ javafaq/javatutorial.html
http://freewarejava.com/
http://WebDevelopersJournal.com/hubs/javahub.html
 www.javalobby.org
www.javacoffeebreak.com/tutorials/swing/indEX.html
http://java.sun.com/docs/books/tutorial/getStarted/indEX.html
www.javacoffeebreak.com/tutorials/gettingstarted/indEX.html
http://java.sun.com/developer/onlineTraining/
http://scv.bu.edu/Tutorials/WWWProg/Java/
www.tutorialized.com/tutorials/Java/General-Java/1
http://mindview.net/Books/TIJ/DownloadSites
http://www.freewarejava.com/
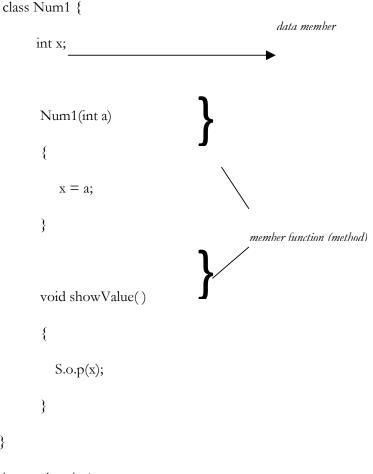http://www.gcek.net/ref/books/zip/
http://oopweb.com/Java/Documents/IntroToProgrammingUsingJava/VolumeFrames.html
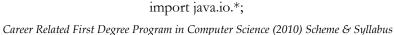http://oopweb.com/Java/Documents/ConcProgJava/VolumeFrames.html
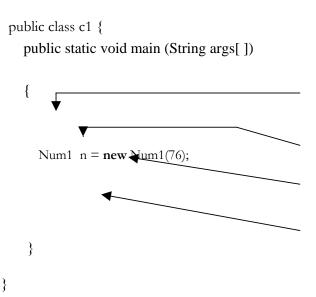http://notes.corewebprogramming.com/

5. NOTE ON CURRICULAR TRANSACTIONS:

Though Java Gurus may differ, it is recommended that Java is introduced by contrasting it with C++. In the introductory stage, do not write main( ) inside the class definition itself, eventhough java permits it. The following style is recommended.

```
class Num1 {

        int x;                          data member


        Num1(int a)

        {

            x = a;
                                        }
        }
                                        member function (method)

        void showValue( )
                                        }
        {

            S.o.p(x);

        }

    }

    import java.io.*;
```

```
public class c1 {
     public static void main (String args[ ])

          {

              Num1  n = new Num1(76);



          }

     }
```

Even though in industry, variables are named by descriptive identifiers, for academics, it may not be appropriate, Plain old x, y, z would do to begin with, for objects. It is advisable that handouts are used in the lecture classes to cover large number of Examples in a short time (Example given in CS1201). Students should not be made to memorise any APIs.   Student seminars may be given in Module V only.

CS1445 Minor Project & Seminar

1. AIMS:

Minor project will give an opportunity for students to prepare for the major project and also contribute to achieving some of the objectives of the major project. Minor projects shall also serve as an opportunity for producing and distributing socially useful softwares. Seminars will give an opportunity for the students familiarize literature search, and to practice assimilating knowledge from published literature on current and emerging topics and communicate the same in their own words through a technical presentation.

3. GUIDELINES FOR MINOR PROJECT

Generally, guidelines for Major projects are applicable to Minor project also. However, in view of the time allotment, the following specific guidelines are applicable:
1. Individual projects are to be permitted, if desired by any student
2. Full-time attachment to any External organization is not mandatory, mostly minor projects can be done in the college itself.
3. The type and scope of the project is completely flexible, the only constraint being that considerable effort should be involved and technical work should not be completely absent.
4. Specifically, web site development, game development, utility software development, educational software development, Malayalam computing, mobile computing etc are to be encouraged.

5. 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.

6. It should be possible for students to develop softwares that cater to the needs of the general public. Students are encouraged to develop software products or software components which should be distributed free through the university website. E-learning is a vast area suitable for very effective distribution of such software for very simple reason that there is scope for a large number of such programs and most often they do not need maintenance or updation. They are to be deployed with source code under General Public License (GPL) so as to make it possible for others to make further improvements.
7. There shall be an internal supervisor for the minor project. While an EXternal supervisor is also permitted in cases where the students opt attachment to External organizations, they shall not be assessing the work.

CS1446 Programming Lab – IV

1. AIMS:

To provide an opportunity for hands-on practice in Java.

2. OBJECTIVES:

This course will provide hands-on practice in a the following topics, under a variety of programming situations with a focus on writing, debugging and analyzing object oriented programs:

* *basic data types and control structures in Java*
* *installing and using JDK*
* *writing applications and applets*
* *managing classes and objects in a variety of situations*
* *using i/o, string, threads and net APIs*
* *solving moderately complex problems involving the above.*

3. SYLLABUS

The 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.

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

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

13. Programs to demonstrate methods of string class

14. Program to demonstrate AWT/Swing graphic methods

15. Program for Loading and Viewing Images, Loading and Playing Sound

16. 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

5. INTERNET RESOURCES

http://java.about.com/od/idesandeditors/

http://www.programmingtutorials.com/java.aspx

http://java.sun.com/docs/books/tutorial/

http://www.cs.chalmers.se/~woj/java/tutorial/getStarted/indEX.html

http://www.cs.chalmers.se/~woj/java/tutorial/applet/indEX.html

http://learning.unl.ac.uk/java1/

http://www.thefreecountry.com/programming/javaide.shtml

http://java.about.com/cs/javaquickstart/tp/begineditors.htm

www.programmersheaven.com

CS1477 Databases Lab

AIMS:

This course will provide hands-on practice in a the following topics, under a variety of computing situations with a focus on writing and analysing SQL statements:
- *Installing and configuring a proper SQL tool*
- *Database design and implementation*
- *Writing and analysing SQL statements*
- *Create user interface (using java AWT) and study the working of a data base in a front end application*

2. SYLLABUS
The laboratory work will consist of 15-20 Experiments. Tools to be used include: Personal Oracle 8/ MS Access/OpenOffice Base/Java. Experiments will cover creating tables including defining relations between them, practicing SQL, Experiments designed around a case study, miscellaneous topics including security, connecting databases to front-end applications. Some sample topics are given below:
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
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
16. Creating an application program that uses database as backend

SEMESTER V

Course Code	Course Name	Minimum hours per week			
		Lecture	Tutorial	Lab	Total
CS1541	Humanities II	3			3
CS1542	Internetworking & Information Security	3	1		4
CS1543	Web Programming	3	1		3
CS1551	Linux Environment	3			3
CS1552	Elective- I	3			4
CS1544	Programming Lab-V			4	4
CS1545	Linux Lab			4	4
	TOTAL	15	2	8	25

CS1541 Humanities II

1. AIMS:

- *To create an interdisciplinary perspective*
- *To create general awareness about humanities*
- *To impart necessary basic knowledge for futuristic technologies and applications which hinge on humanities.*

2. OBJECTIVES:

- *To introduce students to basic concepts, scope, nature of philosophy*
- *To introduce different periods of Western Philosophy*
- *To give elementary idea on various schools of Indian philosophy*
- *To introduce the basic concepts, scope and nature of education.*

3. SYLLABUS:

Module I:Introduction to Philosophy: Definition of philosophy, nature and value of philosophy (indian & western) A base study of different periods in Western Philosophy: Greek (Socretes,Plato, Aristotle), Rationalism, empericism, Kant and Existentialism.

Module II: **Indian Philosophy**: characteristics, sources: Vedas-vedic religions, upanishads- central teachings-tathwamasi; divisions-orthodox, heterodox; heterodox systems: charvaka, materialism, Gainism-theory of reality or anekantaveda, Budhism- four noble truths or aryasathyas.

Module III: **Orthodox systems**: Nyaya- theory of knowledge, vaisesika: atomic theory of categories, Sankhya: prakruthi, purusa, and its evolution, Yoga: ashtangayoga, mimamsa: dharma, Vedanta: nature of Brahman, jagath(world), jeeva(soul) in advaitha vedantha of Sankara, visista advaitha of ramanuja, dvithas of madhava
Module–IV: **Introduction to Education**: Learning; Behaviourist Theories; Gestalt Theory, Field Theory, and Cognitive theories: Bruner, Piaget; Personality: Measurement of Personality.

References

Core reference
1. Franc Philly, A History of Western Phylosophy, Central Publishing House, Alehabad.
2. Hirayanna, Essentials of Indian Phylosophy, George & Unwinn.

Additional Reference

1. Hirayanna, Outlines of Indian Phylosophy, George & Unwinn.
2. C.D. Sharma, A Critical Survey of Indian Phylospophy
3. Dr. S. Radhakrishnan, Indian Phylosophy Vol.I & Vol. II, George Allen & Unwinn
4. Bertrand Russell, A history of Western Phylosophy.

CS1542 Internetworking & Information Security

1. AIM:

To introduce internetworking and the issues and methods of information security over intenetworks.

2. OBJECTIVES:

On completion of this course student shall:
- *Be aware of princliples and protocols of internetworks*
- *understand the basic issues in information security*
- *understand the concept of ciphers and cryptography.*
- *To impart an idea on various ciphers*
- *understand the concept of digital signatures and e-mail security policies*
- *to impart an idea on malicious softwares and remedies.*

3. SYLLABUS

Module I: **Internetworking**- princliples of internetworking, routing principles, IP, datagrams, fragmentation – routing, concepts of congestion control-leaky bucket alorithm. TCP, UDP, DNS, Concept of Client –server interaction – remote login, Email,file transfer protocols – FTP,POP3, SMTP.

Module II: 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 III: **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 IV: **malicious software**, viruses, working of anti-virus software, worms, Trojans, spyware, firewall, characteristics of firewall, packet filters, application level gateways, firewall architecture, trusted systems

Assignments and activities: AES, Blowfish algorithms, Kerberos, Comparison of PGP and S/MIME,study of common malicious software, antiviruses.

Core Reference:

Pachghare, V.K., *Cryptography and Information Security,* PHI, 2009.

Additional Reference:

Dhiren R. Patel, *Information Security: Theory and Practice,* PHI, 2008.
William Stallings, *Cryptography and Network Security*, PHI

Behrouz A. Forouzan, Cryptography and Network Security, TMH,2007.
Banerjee, Internetworking Technologies: An engineering perspective, Prentice Hall of India
Internet Resources

CS1543 Web Programming

1. AIMS:

- *To Expose students to technology of web sites and to introduce various tools and languages required for technical and creative design of state-of-the-art web sites*

2. OBJECTIVES:

- ***To impart basic skills in moderately complex use of the following tools/scripts/languages: HTML, DHTML, CGI Script, Perl, CSS, Javascript, ASP and JSP.***
- *To impart necessary ability to choose the appropriate web tools/languages for creating state-of-the art web sites*
- *To Expose students to current trends and styles in web design and applications*

3. SYLLABUS

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 Side Includes; Example Applications;

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

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

Assignments and Activities: JDBC; PHP; .NET Technology; C#; Creative Design of Web sites; Macromedia flash, Web Servers, Web databases, Web Administration and Maintenance.

4. REFERENCES

4.1 Core References

- V.K. Jain, *Advanced Programming in Web Design*, Cyber Tech Publications, ISBN 81-7884-019-VII, Rs 360/-

4.2 Additional References

- Joel Sklar, Priciples of Web Design, Vikas, Rs 225
- H M Deitel, P J Deitel & A B Goldberg, Internet and Worldwide web programming: How to Program, 3/e, Pearson Education, ISBN 81-297-0408-0, Rs 495/-
- Jain & Siddiqui, J2EE Professional Projects, PHI
- Harris, Javascript programming for the absolute beginner, PHI.

4.3 Internet resources:

www.deitel.com, www.prenhall.com/deitel,
www.asptutorial.info/ Active Server Pages tutorial for beginners
www.learnasp.com/learnasp/ Free lessons, download programs, tutorials, training kit on ASP.
http://notes.corewebprogramming.com/student/XML.pdf Presentation on XML, with Examples
http://notes.corewebprogramming.com/ study materials on HTML, Java, Javaservelets, Javascript

www.rh.edu/~heidic/webtech/notes/   CGI, JSP, JDBC, javaBeans, JavaScript, XML, servelets.
www.redbrick.dcu.ie/help/slides/week7_perl/perl.ppt .
www.cs.drEXel.edu/~jjohnson/2004-05/winter/cs265/lectures/perl.ppt
www.redbrick.dcu.ie/help/slides/week6_php/php.ppt
www.nada.kth.se/kurser/kth/2D2052/ingint04/PHP.pdf

CS1551 Linux Environment

AIM:

> *To familiarize linux working environment and implementation of OS design issues in Linux.*

Objectives

- *Introduce linux working environment*
- *Understand how install and configure linux*
- *Learn how operating system design principles are implemented in Linux*
- *Learn how to write shell scripts*
- *Learn the architecture of linux kernel and how resources are managed in Linux*

SYLLABUS

Module I: Introduction to Linux Operating System, Architecture, Multiprogramming, Utilities in Linux, Shells, Security for users, Linux Installation- disk partitioning, partition naming, mount points, installation classes, using & configuring LILO, configuring network, dual booting. File System: naming conventions, types of files, types of users, file access permissions, directory commands, file commands, locating files, redirection, filters, pipes, vi editor.

Module II: Linux processes, PID, Process Control Block, Linux memory management system, virtual memory in Linux, File System: naming conventions, security, file protection, pipelines, Linux kernel architecture: process management, scheduler, memory manager, the virtual file system, inter-process communication, module management,

Module III: Shell script: Executing shell scripts, variables, reading values to variables, environmental variables, conditional Execution: if-else, case-esac, iterations: while, until, for, break and continue, shift, controlling process Execution, background processing, scheduling tasks.

Module IV: Networking in Linux: configuring networks, remote login, Communication with other users, talk, write, finger, file transfer protocols, ftp, e-mail, pine, GNOME, KDE, printing, installing packages, internetworking.

Activities and assignments: Different Linux makes (Redhat, Fedora, Ubuntu etc.), packages in linux, case study of open source softwares, Comparison of Linux architecture with Windows versions.

4. Core Reference:

1. Operating System: Linux, NIIT, Prentice Hall of India, 2003.

2. *Operating Systems & Sytems Programming* – P. Balakrishna Prasad, SciTech Publishers, ISBN 81-88429-37-6, Rs 210

Additional reference:

1. An introduction to Operating Systems: Concepts and Practice 2/e, Pramod Chandra P. Bhatt, PHI, 2007.

2. Richard Peterson, Linux Programming: A Beginners'Guide, DreamTech.

Internet Resources:

www.linux-tutorial.info/   *www.yolinux.com/TUTORIALS*

www.linuxplanet.com/   *www.redhat.com/docs*
www.intelligentedu.com/newly_researched_free_training/Linux.html
www.linux.org/lessons

CS1552A Artificial Intelligence

1. AIMS:

To Expose students to basic concepts and tools of Artificial Intelligence and create awareness about its applications, both current and futuristic

2. OBJECTIVES:
- *To introduce the notion of machine intelligence*
- *To introduce the symbolic processing paradigm of AI and algorithms for state space search*
- *To introduce the knowledge representation formalism*
- *To introduce basics concepts and challenges of Robotics*
- *To introduce basics concepts and challenges of Speech and Language Processing*
- *To introduce basics concepts and challenges of Expert systems*
- *To give basic introduction to some of the tools/languages used in AI field*

3. SYLLABUS

Module–I: Introduction to AI: Intelligence & AI: Turings Test, branches of AI, AI and search process: Combinatorial Explosion, branching factor, forward and backward reasoning, need for heuristics, search methods: Random, Depth-first, Breadth-first, Best First, Hill-climbing, A* and AO* algorithms – demonstration on 8-tile puzzle/cannibals on the boat problem; Game Playing: Min-Max and modified Min-Max, alpha-beta pruning.

Module–II: Knowledge Representation & Reasoning: Logic: Propositional Logic, Synatx & Sematics, Normal forms in prepositional logic; Predicate Logic: Normal forms in predicate logic; Resolution: Herbrand's Theorm, Resolution in predicate calculus, Theorem Proving; Knowledge Representation Techniques: Procedural vs Declarative Representation; Semantic Nets, Frames, Scripts, Conceptual Dependency. Reasoning: Non-monotonic, Probablistic, Certainity and Fuzzy based reasoning Systems.

Module–III : Speech, language and vision Processing: Human Speech: basic mechanism, phones, phone classification; Speech Processing: spectrum and spectrograms, speech coding, speech recognition, speech synthesis; applications; Natural Language Processing: Lexical, Syntactic, Semantic, Pragmatic and Discourse processing; ambiguity in natural languages, General introduction to parsing techniques; Features of Standard Tools; Applications. Computer Vision: Image acquisition, processing, analysis, understanding; Applications

Module–IV: Expert Systems: Architectures; Knowledge Bases and Inference Engines; Case study of MYCIN and DENDRAL; Applications; Robots, software agents.

Assignments and activities: Miscallaneous Topics: *Generic Introduction to LISP and Prolog; Critic of Artificial Intelligence; Neural Network Models; Genetic Algorithms; Molecular Computers; Future of AI.*

4. REFERENCES

4.1 Core References

Ben Coppin, *Artificial Intelligence Illuminated,* Narosa, ISBN 81-7319-671-0, Rs 295/-

V S Janakiraman, K Sarukesi, P Gopalakrishnan, *Foundations of Artificial Intelligence,* Macmillan, India, ISBN 033392 625 0 *[Rs 157]*

4.2 Additional References

Rajendra Akerkar, *Introduction to Artificial Intelligence,* PHI, Rs.150.

Alison Cawsey, Essence of Artificial Intelligence, Prentice Hall, ISBN: 01-3571-7795, Price: 12.95 UKP.

Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, Prentice Hall of India ISBN 81-203-0777-1; [Rs 150]

Ben Gold, Nelson Morgan, Speech and Audio Signal Processing, John Wiley & Sons, ISBN 9-814-12655-1; $7.50

Roger Penrose, The Emperor's New Mind.

4.3 Internet resources:

www.aaai.org : American Association of Artificial Intelligence, //ai-depot.com: tutorials, demonstrations, www.aist.go.jp/NIBH/~b0616/Lab/links, neuron.eng.wayne.edu/software.html, www.fuzzy.logic.com, www.austinlinks. com/ Fuzzy, http://www.franz.com/: Lisp programs, A site for AI only, looks informative with tutorials & demonstrations.

CS1552B Bioinformatics

1. AIMS:

To motivate students towards the field of Biology where the service of IT professionals are much awaited.

2. OBJECTIVES:

On completion this course, student should:
- *Refresh the knowledge in Biology*
- *Develop ideas on representing the biological terms in Computer Science.*
- *Be aware of the developments in the emerging field of Bioinformatics.*

3. SYLLABUS

Module I Introduction: definition of Bioinformatics, history, application areas; basics of life science: eukaryotic, prokaryotic, cell structure, molecules of the cell, inorganic, organic, carbohydrates, lipids, protein, nucleic acids DNA & RNA

Module II DNA structure: double helix, chromosomes, genomes, gene, genomics; RNA structure: mRNA, tRNA, rRNA; Protein structure: primary, secondary, tertiary, amino acids & IUPAC code, proteome and proteomics; central dogma of molecular biology, DNA finger printing

Module III Sequence analysis/Alignment: DNA sequence, RNA sequence, Protein sequence, sequence alignment classifications, analyzing protein sequence, human insulin sequence, analyzing DNA sequence, IUPAC code for DNA sequence, palindromes in DNA sequence, RNA sequence analysis; FASTA format, standard genetic code

Module IV Biological databases: different types, typical data banks, GenBank, Swissprot, PDB; molecular visualization tools : Rasmol, Swiss PDB viewer; Searching PubMed, Protein information site: EXpasy; retrieving protein/DNA sequences, Exploring the Human Genome

Assignments and Activities: Branches of bioinformatics: genomics, proteomics, computer aided drug design, micro arrays, system biology Applications of Bioinformatics in Biodiversity, Human Genetics, Gene Therapy, Agriculture, etc.

4. Core Reference

1. Bryan Bergeron, *Bioinformatics Computing,* PHI, Rs.250.

5. Additional Reference

1. N. Chavali: Bioinformatics and Bioprogramming, Universities press.
2. Jean-Michel Claverie and Cedric Notredame, Bioinformatics: A Beginner's Guide, Wiley Publishing, Inc, 2006

3. Dr. K Mani & N Vijayaraj, Bioinformatics: A practical approach, Aparna Publications
4. Harshawardhan P Bal, Bioinformatics: Principles and Applications, Tata McGraw Hill Publishing Company Ltd.
5. Dan E Crane and Michael L Raymer, Fundamental Concepts of Bioinformatics, Pearson Education

5. Internet Resources:

1. http://us.EXpasy.org
2. www.rcsb.org
3. www.ebi.ac.uk

CS1552C Algorithm Analysis and Design

1. AIMS:

To make students able to devise and analyze new algorithms by themselves.

2. OBJECTIVES:

On completion this course, student should:

- *Have better awareness about fundamental strategies of algorithm design*
- *Develop a better idea about different computational models*
- *Implement some typical algorithms*

3. SYLLABUS

Module–I: Definition and terminology, randomized algorithms: informal descriptions, identifying the repeated elements, primality checking, Divide and conquer method: binary search, finding maximum and minimum, selection worst case optimal algorithms, Strassen's matrix multiplication

Module–II: Greedy method: Knapsack problem, tree vertex splitting, minimum cost spanning trees, Prim's algorithm, Kruskal's algorithm, Single source shortest paths, Dynamic programming: Multi stage graphs, all pair shortest paths, single source shortest paths, general weights, reliability design, traveling sales person's problem

Module–III: Back tracking: 8 queen's problem, sum of subsets, graph coloring, Hamiltonian cycles, Knapsack problem, Branch and bound: LC search, the 15 puzzle, control abstraction for LC, bounding, FIFO branch and bound, LC branch and bound, 0/1 Knapsack – LC branch and bound solution, FIFO branch and bound solution

Module–IV: Algebraic problems: method, evaluation and interpolation, Fast Fourier transform, modular arithmetic, Lower bound theory: comparison trees, ordered searching, sorting, selection

Assignments and activities: NP hard and NP complete problems: basic concepts, NP hard graph problem, Clique decision problem, node cover decision problem, traveling salesperson problem, AND/OR graph problem

4. REFERENCES

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekharan –Computer Algorithms / C++, Second Edition- Universities Press.

Horowitz, Sahni, Rajasekharan, Fundamentals of Computer Algorithms, Galgotia

Coremen, Leiserson, Rivest, Introduction to algorithms, PHI

Ullman, Hopcroft, Alfred, Design and analysis of Computer Algorithms, Addison Wesley

Michael T. Goodrich and Roberto Tamassia ,Algorithm Design - Foundations, Analysis & Internet EXamples

Michael T. Goodrich and Roberto Tamassia, Data Structures and Algorithms in Java

Michael T. Goodrich, Roberto Tamassia and David M. Mount , Data Structures and Algorithms in C++

CS1544 Programming Lab V

1. AIMS:

- *To give hands-on Exposure to various tools and languages required for technical and creative design of web sites*

2. OBJECTIVES:

To practice moderately complex use of the following scripts/languages/technologies:

- *HTML, DHTML, CSS,*
- *Javascript,*
- *CGI Script, Perl,*
- *ASP and JSP.*

3. SYLLABUS

The laboratory work will consist of 15-20 Experiments

1. Practicing basic HTML tags, text tags test syles, 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. Exercises covering basic introduction to Java Servelets
15. Exercise involving JDBC

16-20: Development of a web site involving a variety of tools practiced above

4. REFERENCES

4.1 Core References

• V.K. Jain, Advanced Programming in Web Design, Cyber Tech Publications, ISBN 81-7884-019-VII [Rs 360/-]

4.2 Additional References

• H M Deitel, P J Deitel & A B Goldberg, Internet and Worldwide web programming: How to Program, 3/e, Pearson Education, ISBN 81-297-0408-0, Rs 495/-

CS1545 Linux Lab

1. AIMS:

- *To give hands-on Exposure to Linux operating system and environment and various tools and languages in Linux platform.*

2. OBJECTIVES:

To practice moderately complex use of the following scripts/languages/technologies:
- *To practice linux installation procedure and configuration*
- *To practice use of shell scripts*
- To practice moderately complex use of PHP.

Linux Installation- disk partitioning, partition naming, mount points, installation classes, using & configuring LILO, configuring network, dual booting., installation of different makes (Fedora, RedHat, Ubuntu etc.)

File System: naming conventions, types of files, types of users, file access permissions,

directory commands

file commands, locating files, redirection, filters, pipes, vi editor.

Networking in Linux: configuring networks, remote login, Communication with other users, talk, write, finger, file transfer protocols, ftp, e-mail, pine, GNOME, KDE, printing, installing packages, internetworking.

Shell script: Executing shell scripts, variables, reading values to variables, environmental variables, conditional Execution: if-else, case-esac, iterations: while, until, for, break and continue, shift, controlling process Execution, background processing, scheduling tasks.

PHP:
      PHP environment, installing and configuring Apache and MySQL for PHP, PHP variables, data types, functions, conditional statements, swithc, looping structures, arrays, cookie basics, browser redirection, MySQL basics, connecting MySQL with PHP, inserting and returing tables data using PHP

References:

1. Operating System: Linux, NIIT, Prentice Hall of India, 2003.
2. Richard Peterson, Linux Programming: A Beginners'Guide, DreamTech.
3. Richard Stones & Neil Mathew, Linux Programming 2/e, Wrox Press Ltd.
4. Christopher Negus, Linux Bible, Wiley India Nic.
5. Thompson, Goodman, Nowicki, *Professional PHP,* Wiley-Dreamtech, Rs. 449.

Internet Resources:

*www.**linux-tutorial**.info/*   *www.yo**linux**.com/**TUTORIALS***

*www.**linux**planet.com/*   *www.**redhat**.com/docs*

*www.intelligentedu.com/newly_researched_**free**_training/**Linux**.html*

*www.**linux**.org/lessons*

SEMESTER VI

Course Code	Course Name	Minimum hours per week			
		Lecture	Tutorial	Lab	Total
CS1651	IT & Society	3			3
CS1652	Multimedia Systems	3	1		4
CS1653	Business informatics & E-commerce	3	1		4
CS1654	Elective - II:	4			4
CS1641	Multimedia Lab	4			4
CS1642	Major Project & Viva			6	6
	TOTAL	17	2	6	25

CS1651 IT & Society

1. AIMS:

• *To impart knowledge required for the student to emerge as computer professional*

2. OBJECTIVES:

By the end of this course, the student should be:
- Having a clear view of what professionalism is
- Aware of ethical issues in computing profession
- Aware of managing quality
- Aware of quality certifications
- Having an Exposure to Cyber law

3. SYLLABUS

Module–I: What is a profession – who is a professional – core qualities of a professional – Environments and their impact and complexity – social attitudes, beliefs and values

Module –II: Codes of ethics - solving ethical conflicts, moral reasoning and ethical theories– responsibilities and rights. Computer ethics : ethics and the internet – hacking – netiquette – privacy

Module-III: Quality Management. Concept of quality, total quality management, 7 sigma principles, ISO certifications, Component maturity models, CMM Levels.

Module-IV Cyberlaw: Intellectual property rights – basic ideas – copyright concepts – copyrights applied to softwares – software licensing – patents in software – Indian copyright law and provisions for software – Indian patent law and provisions for software – various licencing models - arguments against copyrights and patents in software – free softwares – GPL software freedoms– open source softwares

Assignments and activities: Professional societies in Computing: IEEE, ACM, BCSI, CSI, Awards in the field of Computing, NASSCOM, Digital Divide, History of Computerisation in India and Kerala, Preparing for a career

4. REFERENCES

4.1 Core References

M Govindarajan, S Natarajan, V S Senthil Kumar, Engineering Ethics, PHI, 81-203-2578-8, Rs 150/-
Poornima M. Charantimath, Total Quality Management, Pearson Education, ISBN 81-297-0082-4, Rs 150/-
Richard Stallman, Free Software: A Perspective, Prajasakthi Book House, Hyderabad, Rs 60/-
Indian Copyright Act and Indian Patent Acts

4.2 Additional References

Deborah G Johnson, Computer Ethics, Pearson Education, ISBN81-7808-306-X, Rs 175/-
Shailendra Nigam, Total Quality Management, , Excel Books, ISBN 81-7446-419-0, Rs 295/-
Charles B Fleddermann, Engineering Ethics, Pearson Education, ISBN 81-297-0273-8, Rs 125/-
James S Bowman, et. Al., The Professional Edge, PHI, ISBN – 81-203-2602-4, Rs 150/-

NIIT, Building a Portfolio, A career enhancement guide, PHI, ISBN 81-203-2689-X, Rs 250/-
Kenneth Kensington, Deepak Kumar, Experience in India : Bridging the Digital Divide, Sage
Publishers, ISBN 0-7619-3235-6, Rs 250/-

4.3 Internet resources:

www.businessethics.org, www.ibe.org.uk, www.globalethics.org,
www.school-for-champions.com/ ,
www.comp.lancs.ac.uk/computing/resources/IanS/SE7/Presentations/PPT/ch27.ppt
www.coba.unr.edu/faculty/rontl/07-Quality-Mgt.ppt
http://homepages.stmartin.edu/fac_staff/dstout/MEM650/Ch01%20TQM.ppt
www.ieee.org, www.acm.org, www.bcs.org.uk
http://www.digitaldivide.org/ - DigitalDivide

CS1652 Multimedia Systems

1. AIMS:

• *To introduce students to various multimedia elements along with the theoretical underpinnings and to Expose them to integration of these elements.*

2. OBJECTIVES:

By the end of this course, students should be:

- *Familiar with features of text, audio, images, video and active contents as multimedia elements*
- *Familiar with representational methods for the above elements*
- *Familiar with the file formats for the above elements*
- *Aware of various application softwares used to process the above elements*
- *Aware of various applications of multimedia*

3. SYLLABUS

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

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

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

Assignments and Activities: 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

4. REFERENCES

1. Ralf Steinmetz Klara Nahrstedt : Multimedia Applications , Springer International Edition

4.1 Core References

Ralf Steinmetz, Klara Nahrstedt, *Multimedia Fundamentals Vol I*, Pearson Education, ISBN 81-297-0479-x,   Rs 160/-

Malay K. Pakhira, Computer Graphics Multimedia and Animation, PHI, 2008.

4.2 Additional References

Judith Jeffcoate, Multimedia in Practice: Technology & Applications, PHI

D P Mukherjee, Fundamentals of Computer Graphics and Multimedia, Prentice Hall of India, ISBN 81-203-1446-8, Rs 125/-

4.3 Internet resources:

http://www.school-for-champions.com/flash.htm : Study material for flash.

http://lorien.ncl.ac.uk/ming/resources/cal/mmedia.htm: A collection of multimedia tools, and links.

http://www.macromedia.com/devnet/mx/coldfusion/articles/rd_cf.html: Trial versions, and tutorials

http://macromedia.com : Free downloads, seminars, developer centre etc.

CS1653 Business Informatics & E-commerce

1. AIMS:

To create an awareness about role of IT in business and to introduce concepts and techniques of e-ommerce

2. OBJECTIVES:

By the end of this course, the student should:
- Have an awareness about role of IT in business
- Have knowledge of basic concepts of e-commerce
- Be aware of different types of e-commerce web sites and different modes of payments
- Be aware of security and legal issues in e-commerce

3. SYLLABUS

Module–I: IT and business, various applications of IT in business field

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

Module–III : Electronic payment systems – relevance of currencies, credit cards, debit cards, smart cards, e-credit accounts, e-money, security concerns in e commerce, authenticity, privacy, integrity, non-repudiation, encryption, secret key cryptography, public key cryptography, SET, SSL, digital signatures, firewalls

Module–IV: Marketing on the web, marketing strategies, creating web presence, advertising, customer service and support, web branding strategies, web selling models

Assignments and Activities: 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.

4. REFERENCES

4.1 Core References

NIIT, Basics of Ecommerce, PHI, ISBN 81-203-2432-3, Rs 195/-

Erfan Turban et. al., Electronic Commerce–A Managerial Perspective, Pearson Education, ISBN 81-780-8362-0, Rs 250/-

4.2 Additional References

R Kalokota, Andrew V. Winston, Electronic Commerce – a Manger's guide, Pearson Education, ISBN 81-780-8158-X, Rs 295/-

4.3 Internet resources:

www.ecommercetimes.com, www.online-commerce.com, www.rsa.com, www.ntsecurity.com

www.school-for-champions.com/ecommerce.htm, www.easystorecreator.com/ecommerce-tutorial.asp, www.website101.com/shopping_ecommerce/open-source-ecommerce.html : Open Source Ecommerce,

http://wordpress.org/articles/home-business--ecommerce-tutorial.htm,

http://lsirpeople.epfl.ch/despotovic/CEC2004-Tutorial.pdf

CS1654A Mobile Programming

1. AIMS:

- *To introduce wireless application protocol technology and applications*

2. OBJECTIVES:

- *To introduce technology of mobile phones and pocket computers*
- *To introduce applications of WAP*
- *To introduce wireless communication technology such as GPRS*
- *To impart basic idea on portal servers, data synchronization*

3. SYLLABUS

Module-I: Overview of HTTP, HTML, XML, Basic concepts of WAP, WAP architecture, Wireless application environment, WAP Client, WAP browser, working of WAP application, basic advantages, various applications, WAP Project elements, Wap 2.0,

Module-II: The WML language - character set, variable types, cards elements, attributes, entities, WML variables and contexts, tasks and events, WML user interaction, WML timers, Decks, templates, cards, Text and image formatting, browser library, handling audio.

Module-III: Web services, web service architecture, WSDL, UDDI, Web service security, web service for remote portals, Connectivity: GSM, CDMA, TDMA, GPRS, Wireless application services, bluetooth, IrDA protocols,

Module –IV: Gateways, WAP gateway, transcoding, Web portals-B2B, B2E, B2C, portal structure, Extensions for mobile devices, synchronization of mobile device and wired network, local, remote, pass-through models, problems with synchronization.

Assignments and Activities: Emerging topics in mobile communications – technology convergence in mobile phones- GSM standard telephones, WAP application development with WML and WMLScript, a calculator and a game development. SDK for WAP development.

4. REFERENCES

1. C. S. R Prabhu: Mobile Computing , Universities Press

4.1 Core References

1. Uwe Hansmann, Lothar Merk, Martin S. Nicklous, Thomas Stober, *Principles of Mobile computing 2/e,* Springer International, ISBN 81-8128-073-3

2. Martin Frost, Learning WML and WMLScript, O'Reilly, ISBN-81-7366-317-3, Rs 125

3. Sipra das Dit, BK Sikdar, Mobile Computing, PHI 2009 Edition

4.2 Additional References

S. Ruseyev, WAP Technology and Applications, Eswar Press, ISBN 81-7874-005-2, Rs 295

4.3 Internet resources:

www.bitpipe.com Free White Papers and Reports on Wireless & Mobile Computing.
http://www.managingchange.com/mediums/mobile/overview.htm
www.doc.ic.ac.uk/~nd/surprise_96/journal/vol4/vk5/report.html: Mobile computing
www.doc.ic.ac.uk/~nd/surprise_96/journal/vol1/vk5/article1.html

www.cs.berkeley.edu/~randy/Courses/CS294.S96/MobiComp.pdf
http://net.pku.edu.cn/mobile/L1-introuction.ppt
www.phone.com for downloading SDK
www.nokia.com

CS1654B Embedded Systems

1. AIMS:

- *To CX1pose students to basic concepts of embedded systems along with its hardware and software underpinnings.*

2. OBJECTIVES:

- ***To introduce embedded systems architecture***
- *To introduce embedded operating systems*
- *To introduce embedded system software development using C*
- *To introduce various applications of embedded systems*

3. SYLLABUS

Module –I: Introduction to Embedded Systems, Stand-alone and real-time embedded systems, network appliances and mobile devices, Requirements of embedded systems, Embedded processors, 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, Embedded system 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

Assignments and activities: Applications of embedded systems: hand-held devices, consumer electronics, control systems, biomedical systems, data communication. Recent developments, System on a chip, Smart cards.

4. REFERENCES

4.1 Core References

Dreamtech Software Team, Programming for embedded systems, Wiley Dreamtech India, ISBN 81-265-0296-7, Rs 399/-

4.2 Additional References

Daniel W Lewis, Fundamentals of embedded software, Pearson Education, ISBN 81-7808-604-2, Rs 150/-

4.3 Internet resources:

www.vissim.com simulation and embedded system design software (free)

CS1654C Compiler Design

1. AIMS:

To create better understanding about the different steps to design and construct a compiler.

2. OBJECTIVES:

On completion this course, student should:
- *Have better awareness about the structure of a compiler*
- *Understand the different parsing techniques*
- *Create the clear idea of designing and constructing a new compiler of their own.*

3. SYLLABUS

Module–I: Introduction: Definition and structure, translators, phases of a compiler, compiler writing tools, some typical Examples

Module –II: Lexical analyzer: Role, regular Expressions, finite automata, implementation

Module-III: Parser: Definition, different parsing techniques, shift reduce, operator precedence, top down, predictive, LR, LALR, parsing table design

Module-IV Translation: Syntax-directed, parse trees, three address codes, symbol tables, code optimization

Assignments and Activities: *Error detection, code generation, case study, familiarization of various tools like FlEX, YACC.*

4. References

1. Chattopadhyay, *Compiler Design*, PHI. Rs. 175.
Additional Reference
1. Alfred V Aho, Jeffrey D Ullman, Principles of Compiler Design, Narosa Publications
2. Das, *Compiler Design using FlEX and YACC*, PHI.

CS1641 Multimedia Lab

Aim: To familiarize designing tools used in web development/Image processing/video editing.

Syllabus

Any one of the following components shall be practiced.

       (a) Designing tools: Dream Weaver, Flash, Photoshop, Gimp

       (b) Image Processing: MATLAB or IDL

       (c) Video editing: 3DMAX/Adobe Premiere/Coral VideoStudio

End semester Assessment: shall be conducted along with the evaluation of major project. Students shall be required to complete an assignment in any one of the above tools. The choice of tool shall be the right of the student.

CS1642 Major Project & Viva

1. AIM:

- *To Expose student to industry-standard project practices, through a real-life project work under time and 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 real life 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

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

3.1 Planning the Project: The BSc(Computer Science) Major Project is an involved Exercise which has to be planned well in advance. The topic should be chosen in Semester 4 itself and the case study 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 4 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 is to 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 Character Recognition, 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 difficult choice. If any student identifies proper support in terms of guidance, technology and references from 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 could be markedly different from type (a) and is left to the proposer/external supervisor of the projects

3.2 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 also be given the choice of forming themselves into teams with 3 to 5 members (teams less than 3 members may be permitted in Exceptional cases, for valid reasons). A gender mix should also be strongly suggested. A team leader shall be elected through drawing lots. Teams shall maintain team meeting minutes and ensure that every team member has tasks assigned in writing. Team meeting minutes shall form a part of the Project Report. Even if students are doing projects as groups, each one must independently take up different modules of the work and must submit the reports also independently (though, in such cases, some common materials is permissible). Evaluation will also be done independently.

3.3 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.

3.4 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 Aims, 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 experience and (iii) the services of an external guide with industry experience is obtained.
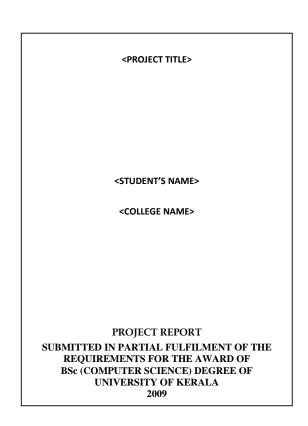
3.5 Project Management: Head of Institute/Principal of College should publish a list of students, projects topics, internal guide and external organization (if any) and teams agreed, before the end of semester 5. Changes in this list may be permitted for valid reasons and shall be considered favourably 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 3 teachers 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 orginal 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.

3.6 Documentation:

Four copies of the project report must be submitted by each student (one for department library, one for the organization where the project is done, one for the external examiner and one for the student himself/herself). After affixing signature of external examiners two copies will be returned at the time of the viva, which are for the external organization and for the candidate. A CD containing soft copy of the project report, source code and binaries recorded in different folders

should also be submitted for documentation in the library. The CD also should bear the name of student, title of the project, year etc. The format for preparation of the project report is standardized from 2004 onwards (students need not consult earlier project reports). 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 20 point, 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

<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
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.

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 a bonafide record of the project work done by Sri/Kum........................ under our supervision and guidance, towards partial fulfillment of the requirements for the award of the Degree of BSC (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 fulfillment of the requirements for the award of the Degree of BSC (Computer Science) of the 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.

3.7 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 of project 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

3.7 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 their organization or under their guidance. Where possible, students should attempt to obtain at least a joint IPR for the University. In cases where project works are of public utility, students shall be asked to publish their work including source code and documentation, in so far as their rights are clear.

4. REFERENCES

4.1 Core References

- S A Kelkar, Software Project Management, Prentice Hall of India [Rs 150]
- W Alan Randolph, Barry Z. Posner, Effective project planning and management, Prentice Hall of India, ISBN 0-87692-776-2, Rs 75/-

4.2 Additional References

- Greg Mandanis, Software Project Management Kit for Dummies, IDG Books, ISBN 81-265-0100-6 [Rs 279]
- Joel Henry, Software Project management, ISBN 0-201-75865-2
- Frederic P B, Mythical Man-month: Essays on Software Engineering, Addison Wesley
- David Lamport, Latex: A document Preparation System, 2/e, Pearson Education, ISBN 81-780-8575-5, Rs 275/-
- McLuhan, Understanding Media
- George Gheverghese Joseph, The Crest of the Peacock: Non-European Roots of Mathematics, Affiliated East West Press, ISBN 81-85938-52-0, Rs 150/-
- Jayamani C. V., Health Management: A New Perspective,Institute of management development & Research, Trivandrum, Rs 70
- Sukanya Datta, Operation Gene, CSIR, New Delhi ISBN 81-7236-087-8, Rs 20/-
- David Cogswell, Chomsky: For Beginners, Orient Longman,ISBN 81-250-2047-0, Rs 180