KANNUR UNIVERSITY
FACULTY OF ENGINEERING

Curricula, Scheme of Examinations & Syllabi for B.Tech Degree Programme (III-IV Semesters) in INFORMATION TECHNOLOGY With effect from 2007 Admissions

THIRD SEMESTER

Code	Subject	Hours/Week			Sessional Marks	University Examination	
		L	T	P/D		Hrs	Marks
2K6IT 301	Engineering Mathematics II	3	1	-	50	3	100
2K6IT 302	Humanities	3	1	-	50	3	100
2K6IT 303	Computer Organization & Design	3	1	-	50	3	100
2K6IT 304	Computer Programming	3	1	-	50	3	100
2K6IT 305	Switching Theory & Logic Design	3	1	-	50	3	100
2K6IT 306	Electronic Circuits & Systems	3	1	-	50	3	100
2K6IT 307(P)	**Programming Lab**	-	-	3	50	3	100
2K6IT 308(P)	**Computer Organization Lab**	-	-	3	50	3	100
TOTAL		**18**	**6**	**6**	**400**	**-**	**800**

FOURTH SEMESTER

Code	Subject	Hours/Week			Sessional Marks	University Examination	
		L	T	P/D		Hrs	Marks
2K6IT 401	Engineering Mathematics III	3	1	-	50	3	100
2K6IT 402	Data Structures & Algorithms	3	1	-	50	3	100
2K6IT 403	Systems Programming	3	1	-	50	3	100
2K6IT 404	Microprocessors & Microcontrollers	3	1	-	50	3	100
2K6IT 405	Discrete Computational Structures	3	1	-	50	3	100
2K6IT 406	Programming Language Concepts	3	1	-	50	3	100
2K6IT 407(P)	**Data Structures Lab**	-	-	3	50	3	100
2K6IT 408(P)	**Hardware Lab**	-	-	3	50	3	100
TOTAL		**18**	**6**	**6**	**400**	**-**	**800**

2K6 1T 301 : ENGINEERING MATHEMATICS II

3 hours lecture and 1 hour tutorial per week

Module I:

Infinite Series: Convergence and divergence of infinite series – Ratio test – Comparison test – Raabe's test – Root test – Series of positive and negative terms- absolute convergence – Test for alternating series. ***Power Series***: Interval of convergence – Taylors and Maclaurins series representation of functions – Leibnitz formula for the derivative of the product of two functions – use of Leibnitz formula in the Taylor and Maclaurin expansions

Module II:

Matrices: Concept of rank of a matrix –echelon and normal forms – System of linear equation - consistency – Gauss elimination– Homogeneous liner equations-Fundamental system of solutions- Inverse of a matrix – solution of a system of equations using matrix inversion – eigen values and eigen vectors - Cayley- Hamilton Theorem.

Module III:

Vector Integral Calculus: Evaluation of line integral, surface integral and volume integrals – Line integrals independent of the path, conservative force fields, scalar potential- Green's theorem- Gauss' divergence theorem- Stoke's theorem (proof of these not required).

Module IV:

Vector Spaces: subspaces–linear dependence and independence–bases and dimension-linear transformations -sums, products and inverse of linear transformations.

References:

1. Kreyszing E. Advanced Engineering Mathematics, Wiley Eastern
2. Sastri. S. S. Engineering Mathematics, Prentice Hall of India.
3. Wylie .C. R. Advanced Engineering Mathematics, Mc Grawhill.
4. B .S. Grewal. Higher Engineering Mathematics, Khanna Publishers.
5. Greenberg. M.D. Advanced Engineering Mathematics, Pearson Education Asia.
6. Narayanan .S. Manickavachagom Pella and Ramaiah. Advanced Mathematics for Engineering Students, S. Viswanathan Publishers

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 302 : HUMANITIES

3 hours lecture and 1 hour tutorial per week

Module I (20 hours)

Functional English Grammar: Sentence Analysis -Basic Patterns -Noun Group, Verbal Group, and Adverbial Group- Tenses – Conditionals - Active and Passive Voice - Reported Speech

Module II (14 hours)

Technical Communication

1. Nature, Growing need, and importance of technical communication – technical communication skills – listening, speaking, reading, and writing.
2. Barriers to effective communication – improper encoding, bypassing inter- cultural differences etc.
3. Organization in technical communication – spatial, chronological etc.
4. Style in technical communication - objectivity, accuracy, brevity, clarity etc.
5. Technical reports – types and format

Professional Ethics: 1. Ethics in Engineering, copyright – IPR- patents

Module III (10 hours)

Humanities, Science and Technology

1. Importance of humanities to technology, Education and Society
2. Relevance of a scientific temper
3. Relation between science, society and culture – the views of modern thinkers
4. The development of science and technology in society – science and technology in ancient Greece and India – the contribution of the Arabs to science and technology – recent advances in Indian science.

Reference books

1. Huddleston R, English Grammar – An outline, Cambridge University Press
2. Pennyor, Grammar Practice Activities, Cambridge University Press
3. Murphy, Intermediate English Grammar, Cambridge University Press
4. Hashemi, Intermediate English Grammar, Supplementary Exercises with answers, Cambridge University Press
5. Vesilind; Engineering, Ethics and the Environment, Cambridge University Press
6. Larson E; History of Inventions, Thompson Press India Ltd.
7. Bernal J. D., Science in History, Penguin Books Ltd.
8. Dampier W. C., History of Science, Cambridge University Press
9. Encyclopedia Britannica, History of Science, History of Technology
10. Subrayappa; History of Science in India, National Academy of Science, India
11. Brownoski J, Science and Human Values, Harper and Row
12. Schrödinger, Nature and Greeks and Science and Humanism, Cambridge University Press
13. Bossel. H., Earth at a Crossroads – paths to a sustainable future, Cambridge University Press
14. McCarthy, English Vocabulary in Use, Cambridge University Press
15. M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw Hill, New Delhi, 2005

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 10 short type questions of 2 marks, from Module 1

Q II - 10 questions of 5 marks, from module II and III for writing short notes with choice to answer any **seven**

Q III - 2 questions A and B of 15 marks from module I for writing essay with choice to answer any one

Q IV - 2 questions A and B of 15 marks from module II for writing essay with choice to answer any one

Q V - 2 questions A and B of 15 marks from module III for writing essay with choice to answer any one

2K6 IT 303 : COMPUTER ORGANISATION & DESIGN

3 hours lecture and 1 hour tutorial per week

Module I (14 hours)

Computer abstraction and technology: Below your program - Under the covers - Historical perspective - Measuring performance - Relating the metrics - evaluating, comparing and summarizing performance - Case study: SPEC95 benchmark – Instructions - Operations and operands of the computer hardware - Representing instructions - Making decision - Supporting procedures - Beyond numbers - Other styles of addressing - Starting a program - Case study: 80x86 instructions

Module II (12 hours)

Computer arithmetic - Signed and unsigned numbers - Addition and subtraction - Logical operations - Constructing an ALU - Multiplication and division - Floating point - Case study: floating point in 80x86

Module III (11 hours)

The processor: Building a data path - Simple and multicycle implementations - Microprogramming - Exceptions - Case study: Pentium Pro implementation

Module IV (15 hours)

Memory hierarchy - Caches - Cache performance - Virtual memory - Common framework for memory hierarchies - Case study - Pentium Pro memory hierarchy - Input/output - I/O performance measures - Types and characteristics of I/O devices - Buses - Interfaces in I/O devices - Design of an I/O system

Text book

1. Pattersen D.A. & Hennesy J.L., *Computer Organisation & Design: The Hardware/ Software Interface*, Harcourt Asia

Reference books

1. Heuring V.P. & Jordan H.F., *Computer System Design & Architecture*, Addison Wesley
2. Hamacher, Vranesic & Zaky, *Computer Organisation*, McGraw Hill

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 304 : COMPUTER PROGRAMMING

3 hours lecture and 1 hour tutorial per week

Module I (15 hours)

Overview of C – Variables, Expressions and assignments, Lexical Elements, Fundamental Data Types, Operators *Control Statements* – if, switch-case, for , while, do, goto, break, switch *Functions*- Parameter passing , scope rules, recursion

Module II (12 hours)

Arrays – One dimensional and Multi Dimensional, *Pointer*-Linked List, Arrays of Pointers, Dynamic Memory Allocations, *Strings* – Operations and functions , *Bitwise Operators and Enumeration Types , Structures and Unions, Files and File Operations*

Module III (13 hours)

Overview of Java Language- Constants, Variables and Data Types, Operators and Expressions *Control Structures* – Decision Making, Branching and Looping, *Object Oriented Programming* – Concept of Classes, Objects and Methods, Benefits Java and OOP- Polymorphism and Overriding of methods, Inheritance

Module IV (12 hours)

Arrays and Strings, Interfaces, Multiple Inheritance, Packages – Putting Classes together – Managing Errors and Exceptions – Applet Programming and Graphics Programming (Basics only) – Managing Input/Output Files in Java

Text books

1. Kelley, Al & Pohl, Ira.,., *A Book on C- Programming in C*, 4th Ed,, Pearson Education (Modules I &II)
2. Balagurusamy E., Programming with Java: A Primer, 3rd Ed., Tata McGraw-Hill (Module III &IV)

Reference books

1. Balagurusamy E., Programming in ANSI C, Tata McGraw Hill
2. Eckel, Bruce., *Thinking in Java*, 2nd Ed, Pearson Education

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 **short** type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 305 : SWITCHING THEORY & LOGIC DESIGN

3 hours lecture and 1 hour tutorial per week

Module I (14 hours)

Number Systems and codes - Boolean algebra - Postulates and theorems - Constants, variables and functions - Switching algebra - Electronic gates and mechanical contacts Boolean functions and logical operations - Normal and canonical forms - Self-dual functions - Logical operations - Karnaugh map - Prime cubes - Minimum sum of products and product of sums - Quine-McClusky algorithm

Module II (13 hours)

Combinational Logic - Analysis and design of combinational logic circuits - Universal property of the NAND and NOR gates – Adders - Parallel adders and look-ahead adders – Comparators - Decoders and encoders - Code conversion - Multiplexers and demultiplexers - Parity generators and checkers - ROMs, PLAs

Module III (10 hours)

Fault diagnosis and tolerance - Fault classes and models - Fault diagnosis and testing - Test generation - Fault table method - Path sensitisation method - Boolean difference method - Fault-tolerance techniques. *Programmable logic arrays* - PLA minimization - Essential prime cube theorem - PLA folding - Design for testability

Module IV (15 hours)

Counters and shift registers - SR, JK, D and T flip-flops - Excitation tables - Triggering of flip-flops - Flip-flop applications - Latches - Ripple counters - Synchronous counters - Up-down counters - Design of sequential circuits - Counter decoding - Counter applications - Shift registers and their applications - *Clock mode sequential machine* - *S*tate tables and diagrams

Text books

1. Biswas N.N., *Logic Design Theory*, Prentice Hall of India (modules I, II & III)
2. Floyd T.L., *Digital Fundamentals*, Universal Book Stall (module IV)

Reference books

1. Leach D, Malvino A P & Saha-*Digital Principles and Applications,* 6th Ed, Tata McGraw Hill
2. Kohavi Z., *Switching & Finite Automata Theory*, Tata McGraw Hill
3. Marcovitz, Alan, *Introduction to Logic and Computer Design*, Tata McGraw Hill
4. Taub, Herbert. & Schilling., *Digital Integrated Electronics*, McGraw Hill

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 306 : ELECTRONIC CIRCUITS & SYSTEMS

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)
Diode switch, clipping and clamping circuits - Transistor switch - Bistable multivibrator - Schmitt trigger - Monostable and astable multivibrator - Miller and bootstrap sweep generators

Module II (13 hours)
Logic levels - Concepts of SSI, MSI, LSI and VLSI - Logic families: NOT gate, TTL, ECL, CMOS logic - Interfacing - Comparison of logic families - TTL and MOS flip-flops

Module III (13 hours)
Memories: Basic concepts - Read only memories - Programmable ROMs - Static and dynamic random access memories - Memory expansion - Magnetic bubble memories - Magnetic surface storage devices - CD-ROMs - Special memories - Sample and hold circuit - D/A converters - A/D converters - Timing circuits

Module IV (13 hours)
Communication systems - Need for modulation - External and internal niose - Noise figure definition - Amplitude modulation and demodulation - Frequency and phase modulation - Noise and FM - FM demodulation - TRF and superheterodyne receivers - Radiation and propagation of electromagnetic waves

Text books
1. Millman J. & Taub H., *Pulse, Digital & Switching Waveforms*, McGraw Hill (Module I)
2. Taub H. & Schilling D., *Digital Integrated Electronics*, McGraw Hill (Modules II & III)
3. Kennedy G., *Electronic Communication Systems*, Tata McGraw Hill (Module IV)

Reference books
1. Nagarath I.J., *Electronics Analog & Digital,* Prentice Hall India
2. Floyd T.L., *Digital Fundamentals,* Universal Book Stall
3. Schilling D.L. & Belove C., *Electronic Circuits: Discrete & Integrated,* McGraw Hill

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 307(P) : PROGRAMMING LAB

3 hours practicals per week

Set 1 (3 lab sessions)

C Programming - HCF (Euclid's algorithm) and LCM of given numbers - Conversion of numbers from binary to decimal, hexadecimal, octal and back - Evaluation of functions like e^x, sin*x*, cos*x* etc. for a given numerical precision using Taylor's series - String manipulation programs: sub-string search, deletion - Lexicographic sorting of a given set of strings - Generation of all permutations of the letters of a given string using recursion

Set 2 (2 lab sessions)

C Programming - Matrix operations: Programs to find the product of two matrices - Inverse and determinant (using recursion) of a given matrix - Solution to simultaneous linear equations using Jordan elimination. Files: Use of files for storing records with provision for insertion - Deletion, search, sort and update of a record

Set 3 (2 lab sessions)
JAVA - String handling programs, Implementation of Inheritance, Polymorphism, Overriding and Exceptions

Set 4 (3 lab sessions)
JAVA- Input/Output File Operations, Applet and Graphic Programming

Reference books

1. Schildt H., *C: The Complete Reference*, Tata McGraw Hill
2. Kelley, Al & Pohl, Ira.,., *A Book on C- Programming in C*, 4th Ed,, Pearson Education
3. Balagurusamy E., Programming with Java: A Primer, 3rd Ed., Tata McGraw-Hill

Sessional work assessment

Lab practicals & record	= 30
Tests	= 20
Total marks	= 50

University evaluation will be for 100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, preparing the circuit diagram/algorithm/flow chart, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.
Note: Duly certified lab record must be submitted at the time of examination

2K6 IT 308(P) : COMPUTER ORGANIZATION LAB

3 hours practicals per week

Set 1

1. Verification of truth tables of AND, OR, NOT, NAND, NOR and XOR gates, use for gating digital signals
2. TTL characteristics
3. Verification of the postulates of Boolean algebra and DeMorgan's theorem using logic gates
4. Half and full adders, half and full subtractors
5. Digital comparator, parity generator and checker, and code converter
6. Characteristics and operations of RS, gated RS, D, T, and JK master slave flipflops
7. Multiplexer and demultiplexer using gates
8. Shift register, ring counter, and twisted ring counter
9. Decade counter and variable modulo asynchronous counter
10. Simple ALU design.

Set 2

1. Simulation programs for floating point arithmetic, registers and counters
2. Simulation for memory cells and arrays
3. Simulation of simple ALU

Reference books

1. Bhargava et.al., *Basic Electronic Circuits and Linear Circuits,* Tata McGraw Hill
2. Boylestead & Nashelski, *Electronic Devices and Circuit Theory*, 9th Ed, Pearson/PHI
3. Nagarath J., *Electronics Analog & Digital*, Prentice Hall India
4. Millman & Halkias, *Integrated Electronics*, Tata McGraw Hill
5. Morris Mano, Digital Design, PHI
6. Douglous L Perry, VHDL: Programming by Example, McGraw Hill

Sessional work assessment

Lab practicals & record	= 30
Test	= 20
Total marks	= 50

University evaluation will be for 100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, preparing the circuit diagram/algorithm/flow chart, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.
Note: Duly certified lab record must be submitted at the time of examination

2K6 IT 401 : ENGINEERING MATHEMATICS III

3 hours lecture and 1 hour tutorial per week

Module I: (13 hours)

Complex analytic functions and conformal mapping: Complex functions – limits. derivative, analytic function- Cauchy-Riemann equations- elementary complex functions such as powers, exponential function, logarithmic, trigonometric and hyperbolic functions- Conformal mapping – Linear fractional transformations- mapping by elementary functions

Module II: (13 hours)

Complex integration: Line integral, Cauchy's integral theorem - Cauchy's integral formula – Taylor's series, Laurent series – residue theorem – evaluation of real integrals using integration around unit circle, around semicircle, integrating contours having poles on the real axis

Module III: (13 hours)

Jointly Distributed Random Variables: Joint distribution functions, independent random variables , covariance and variance of sums of random variables, joint probability distribution functions of random variables, conditional probability and conditional expectations. ***Curve fitting***: Method of least squares, correlation and regression, line of regression.

Module IV: (13 hours)

Vibrating strings: One dimensional wave equation – D' Alembert's solution – solution by method of separation of variables One dimensional heat equation - solution of the equation by the method of separation of variable Solutions of Laplace's equation over a rectangular region and a circular region by the method of separation of variable

Reference books

1. Kreyszig E. Advanced Engineering Mathematics. Wiley Eastern
2. Johnson, Miller and Freud. Probability and Statistics for Engineers, Pearson Education Asia.
3. Wylie .C.R. Advanced Engineering Mathematics, Mc Grawhill.
4. B.S. Grewal. Higher Engineering Mathematics, Khanna Publishers.
5. Freund. J.E. Mathematical Statistics, Prentice hall of India.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 402 : DATA STRUCTURES & ALGORITHMS

3 hours lecture and 1 hour tutorial per week

Module I (10 hours)

Review of data types - Scalar types - Primitive types - Enumerated types - Character strings - arrays - records - sets - Data abstraction - Complexity of algorithms - Time and space complexity of algorithms using "big oh" notation - Recursion: Recursive algorithms - Analysis of recursive algorithms – Solution of recurrences.

Module II (13 hours)

Object oriented Programming: Concepts, ADT, *Linear Data structures*: linked structures–Ordered array, indirect reference, Linked nodes, insertion and deletion in linked lists - Stacks - Queues – Collections -Lists - Stack and queue implementation using array

Module III (13 hours)

Non linear structures: -Trees , Binary trees – traversals, Graphs- BFS, DFS, Spanning trees , Shortest path algorithms- Heaps and Priority Queues.

Module IV (16 hours)

Searching - Sequential search - Binary search - Searching arrays and binary search trees - Hashing - Introduction to simple hash functions - resolution of collisions - *Sorting*: n^2 Sorts - Bubble sort - Insertion Sort - Selection sort - NlogN sorts - Quick sort - Heap sort - Merge sort .

Text book

1. Sedgewick, Robert., *Algorithms in JAVA*., 3rd Ed.,Pearson Education

Reference books

1. Aho A.V., Hopcroft J.E. & Ullman J.D., *Data Structures and Algorithms*, Addison Wesley (Module I)
2. Hubbard J R & Huray Anita., Data Structures with JAVA – Pearson Education (Module II, III & IV)
3. Cormen T.H., Leiserson C.E., & Rivest R.L., *Introduction to Algorithms*, MIT Press, 1990
4. Lafore Robert., *Data Structures and Algorithms in Java, 2nd Ed., SAMS publishing*
5. Waite, Mitchell., *Data Structures and Algorithms in Java, 2nd Ed., SAMS publishing*
6. Wirth N., *Algorithms +Data Structures = Programs*, Prentice Hall
7. Drozdeck, Adams, Data Structures and Algorithms in Java., Thompson Learnig.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 403 : SYSTEMS PROGRAMMING

3 hours lecture and 1 hour tutorial per week

Module I (15 hours)

Background - System software machine architecture - The simplified instructional computer - Traditional machines - RISC machines. *Assemblers* - Basic Assembler functions - Machine dependent and machine independent - Assembler features - *Assembler design* - Assembler design options - Implementation examples - AIX Assembler

Module II (13 hours)

Loaders and linkers - Basic loader functions - Machine dependent features – relocation and program linking. Machine independent features - automatic library search , loader features - Loader design options – Linkage editors, Dynamic linking, Boot strap loaders and implementation examples- MS-DOS Linker, Sun OS linker

Module III (9 hours)

Macro Processors - Basic macro processor functions - Machine-independent macro processor features – Macro processor Algorithm and Data structures, Conditional Macro expansion, Recursive Macro expansion, General purpose macroprocessors . implementation examples- MASM Macro processor, ANSI C Macro language

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Module IV (15 hours)

Basics of Compilers: Basic compiler functions, different phases of compilers (Introduction only), Interpreters, P- code compilers.

Introduction to Operating systems - Basic principles – Batch processing - Multiprogramming - Timesharing systems and real-time systems - Parallel and distributed systems - *Computer system structure* - Computer system operation - I/O structure - structure - Storage Hierarchy - Hardware protection - General system architecture – Case Study: *General Overview of the UNIX operating system*

Text books

1. Beck L.L., *System Software - An introduction to Systems Programming*, Addison Wesley (First 3 Modules)
2. Silberschatz, Galvin, Operating system (5th edition), Addison Wesley (4th Module)
3. Aho, Revi sethi, Compilers Principles, techniques & Toolss , Pearson edn. (4th module)

Reference books

1. Dhamdhere D.M., *Systems Programminmg & Operating Systems*, Tata McGraw Hill
2. Bach M.J., *The Design of the Unix Operating System*, Prentice Hall India (module IV)
3. Godbole S., *Operating Systems*, Tata McGraw Hill

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 404 : MICROPROCESSORS & MICROCONTROLLERS

3 hours lecture and 1 hour tutorial per week

Module I (15 hours)
Intel 8086 processor - Architecture - Memory addressing - Addressing modes - Instruction set - Assembly language programming - Assemblers - Interrupts - Pin configuration - Timing diagrams - Minimum and maximum mode - Multiprocessor configuration

Module II (12 hours)
Interfacing - Address decoding - Interfacing chips - Programmable peripheral interface (8255) - Programmable communication interface (8251) - Programmable timer (8253) - DMA controller (8259) - Programmable interrupt controller (8257) - Keyboard display interface (8279)

Module III (12 hours)
Introduction to 80386 - Memory management unit - Descriptors, selectors, description tables and TSS - Real and protected mode - Memory paging - Special features of the pentium processor - Branch prediction logic - Superscalar architecture

Module IV (13 hours)
Intel 80196 microcontroller - CPU operation - Memory space - Software overview - Peripheral overview - Interrupts - PWM timers - High speed inputs and outputs - Serial port - Special modes of operation

Text books
1. Hall D.V., *Microprocessors & Interfacing*, McGraw Hill
2. Brey B.B., *The Intel Microproessors - Architecture, Programming & Interfacing*, Prentice Hall
3. Liu Y.C. & Gibsen G.A., *Microcomputer System: The 8086/8088 Family*, Prentice Hall of India
4. Hintz K.J. & Tabak D., *Microcontrollers-Architecture, Implementation & Programming*, McGraw Hill

Reference books
1. Intel Data Book Vol.1, *Embedded Microcontrollers and Processors*
2. Tribel W.A. & Singh A., *The 8088 and 8086 Microprocessors*, McGraw Hill
3. Mohammed R., *Microprocessors & Microcomputer Based System Design*, Universal Bookstall
4. Intel Data Book EBK 6496 16 bit Embedded Controller Handbook
5. Intel Data Book, EBK 6485 Embedded Microcontrollers Data Book
6. Intel Data Book, EBK 6486 Embedded Applications Book

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 405 : DISCRETE COMPUTATIONAL STRUCTURES

3 hours lecture and 1 hour tutorial per week

Module I: Logic (13 hours)
Prepositional Logic - Logical arguments - Consistency completeness and independence - Formal proofs - Natural deduction - Soundness, completeness and compactness theorems - Predicate logic - Completeness - Resolution - Unification algorithm

Module II: Relational structures (13 hours)
Sets relations and functions - Pigeonhole principle - Cardinals - Countable and uncountable sets - Digonalization - Equivalence relations and partitions - Partial order - Lattices and Boolean algebra

Module III: Group theory (13 hours)
Groups and subgroups - Products and quotients - Homomorphism theorems - Cosets and normal subgroups - Lagrange's theorem - Permutation groups - Cayley's theorem - Hamming Codes and Syndrome decoding

Module IV: Rings and fields (13 hours)
Rings, integral domains and fields - Ideals and quotient rings - Euclidean domains - Polynomial rings and division algorithm - Factorization and unique factorization - Irreducibility - Field properties and extensions - Ruler and compass constructions - Introduction to cyclic codes

Text books
1. Truss J.K., *Discrete Mathematics for Computer Scientists*, Addison Wesley (Modules I & II)
2. Kolman B. & Busby R.C., *Discrete Mathematical Structures for Computer Science*, Prentice Hall of India (Modules III & IV)

Reference books
1. Liu C.L., *Elements of Discrete Mathematics*, McGraw Hill
2. Grimaldi P., *Discrete & Combinatorial Mathematics*, Addison Wesley
3. Tremblay, J P., Manohar R - *Discrete Mathematical Structures to Applications to Computer Science* – Tata McGraw-Hill

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 406 : PROGRAMMING LANGUAGE CONCEPTS

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Introduction - role of programming languages - towards higher - level languages - programming paradigms - language description - expression notations - abstract syntax trees - lexical syntax - context-tree grammars - introduction to semantics - imperative programming - statements - syntax - directed control flow - syntactic concerns - handling special cases in loops - types - the role of types - basic types - structured types - procedure activations - introduction to procedures - parameter passing methods - scope rules

Module II (13 hours)

Object oriented programming - grouping of data and operations - constructs for program structuring - information hiding - program design with modules - modules and defined types class declarations - dynamic allocation - templates - object oriented programming - object oriented thinking - inheritance - derived classes and information hiding

Module III (13 hours)

Functional programming - elements of functional programming - a little language of expressions - types - functions declarations - approaches to expression evaluation - lexical scope - type checking - functional programming in a typed language - functional programming with lists - structure of lists - list manipulation - storage allocation for lists

Module IV (14 hours)

Logic programming - computing with relations - introduction to a logic programming language - data structures and control in the language - concurrent programming - parallelism in hardware - implicit synchronization - concurrency as interleaving - liveness properties - safe accon to shaved data - synchronized access to shared variables

Text book

1. 1. Sethi R., *Programming Languages: Concepts & Constructs*, Addison Wesley, 2nd Ed.

Reference books

1. 1. Scott M. L., *Programming Language Pragmatics*, Harcourt Asia (Morgan Kaufman)
2. 2. Sebesta R.W., *Concepts of Programming Languages*, Addison-Wesley, 4th Ed.
3. 3. Tennent R.D., *Principles of Programming Languages*, Prentice Hall International
4. 4. Appleby D. & Vandekopple J.J., *Programming Languages*: *Paradigm & Practice*, Tata McGraw Hill

Sessional work assessment

Assignments	2x10 = 20
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Q I - 8 short type questions of 5 marks, 2 from each module
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Q V - 2 questions of 15marks from module IV with choice to answer any one

2K6 IT 407(P) : DATA STRUCTURES LAB

3 hours practicals per week

1. *Stack and Queue*: Implementation using arrays and Linked lists
2. *Searching Methods*: Binary search and Hashing
3. N^2 *algorithms* – Bubble sort, Insertion Sort
4. *Sorting*: Recursive implementation of Quick Sort and Merge Sort
5. *Binary Search Tree*: Implementation with insertion, deletion and traversal
6. *Graph Search Algorithms*: DFS and BFS on a connected directed graph
7. *Minimal Spanning Tree*: Implementation of Kruskal's and Prim's Algorithms
8. *Shortest Path Algorithms*: Dijkstra and Floyd Warshall Algorithms
9. *Applications of Heap*: Priority Queue and Heap Sort

Reference books

1. Cormen T.H., Lieserson C.E. & Rivest R.L., Introduction to Algorithms, Prentice Hall of India
2. Hubbard J R & Huray Anita., Data Structures with JAVA – Pearson Education

Sessional work assessment

Lab practicals & record	= 30
Test	= 20
Total marks	= 50

University evaluation will be for 100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, preparing the circuit diagram/algorithm/flow chart, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.
Note: Duly certified lab record must be submitted at the time of examination

2K6 IT 408(P) : HARDWARE LAB

3 hours practical per week

Lab 1 : Identification of components/cards and PC assembling from components

Lab 2,3 : Assembly language programming

Lab 4 : TSR (Terminate and Stay Resident) Programming

Lab 5 : ADC and DAC interface

Lab 6 : Waveform Generation

Lab 7 : Stepper Motor interface

Lab 8,9 : Parallel Interface: Printer and HEX keyboard.

Lab 10 : Serial Interface: PC to PC serial interface using NULL MODEM.

Lab 11 : Familiarization of Microcontroller Kit

Lab 12 : Interfacing with Microcontroller Kit

Reference books

1. Messmer H.P., *The Indispensable PC Hardware Book*, 3/e, Addison Wesley
2. Hall D.V., *Microprocessors and Interfacing, 2/e,* Tata McGraw Hill
3. Norton P., *Dos Internals*
4. Hintz K.J. & Tabak D., *Microcontrollers-Architecture, Implementation & Programming*, McGraw Hill
5. Ayala, Kenneth J, *The 8051 Microcontroller*, Penram Publishers
6. Axelson, Jan., *The Microcontroller Idea Book,* Penram Publishers

Sessional work assessment

Laboratory practicals and record	= 30
Test	= 20
Total marks	= 50

University evaluation will be for 100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, preparing the circuit diagram/algorithm/flow chart, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.
Note: Duly certified lab record must be submitted at the time of examination