UNIVERSITY OF CALICUT

Faculty of Engineering

Curriculum, Scheme of Examinations and Syllabi for B.Tech Degree Programme with effect from Academic Year 2000-2001

CS : Computer Science & Engineering

THIRD SEMESTER

Code	Subject	Hours/Week			Sessional Marks	University Examination	
		L	T	P/D		Hrs	Marks
CS2K 301	Engineering Mathematics III	3	1	-	50	3	100
CS2K 302	Data Structures & Algorithms	3	1	-	50	3	100
CS2K 303	Discrete Computational Structures	3	1	-	50	3	100
CS2K 304	Basic Electronics Engineering	3	1	-	50	3	100
CS2K 305	Switching Theory & Logic Design	3	1	-	50	3	100
CS2K 306	Electric Circuits & Systems	3	1	-	50	3	100
CS2K 307(P)	**Programming Lab**	-	-	3	50	3	100
CS2K 308(P)	**Electronics Lab**	-	-	3	50	3	100
TOTAL		**18**	**6**	**6**	**400**	**-**	**800**

CS2K 301 : ENGINEERING MATHEMATICS III

(common with IT2K 301)

3 hours lecture and 1 hour tutorial per week

Module I: Linear algebra I (13 hours)

Vector spaces - subspaces - linear dependence and independence - bases and dimension - gram - schmidt orthogonalization process - linear transformations - sums, products and inverses of linear transformations - linear operator equations

Module II: Linear algebra II (13 hours)

Rank and equivalence of matrices - quadratic forms - characteristic values and characteristic vectors of a matrix - transformation of matrices - functions of a square matrix

Module III: Functions of a complex variable & applications I (13 hours)

Functions of a complex variable - analytic functions - Cauchy-Riemann equations - elementary functions of z - conformal mapping - bilinear transformation - Schwarz-christoffel transformation - transformation by other functions

Module IV: Functions of a complex variable & applications II (13 hours)

Integration in the complex plane - Cauchy's integral theorem - Cauchy's integral formula - series of complex terms - Taylor's series - Laurent's series - Residue theorem - evaluation of real definite integrals - the laplace inversion integral

Text book

Wylie C.R. & Barrett L.C., Advanced Engineering Mathematics , McG raw Hill

Reference books

1. *Churchill R.V., Brown J.W. & Verhey R.F., Complex variables & Applications , McGraw Hill*
2. *Hadley G., Linear Algebra , Addison Wesley*
3. *Kreider D.L., Kuller R.G., Ostberg D.R., & Perkins F.N., An Introdu ction to Linear Analysis , Addison Wesley*
4. *Kreyszig E., Advanced Engineering Mathematics , John Wiley*
5. *Lipschutz S., Linear Algebra , Schaum's Outline Series , 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 1 5 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

CS2K 302 : DATA STRUCTURES & ALGORITHMS

(common with IT2K 302)

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Review of data types - scalar types - primitive types - enumerated types - subranges structures types - character strings - arrays - records - sets - tiles - data abstraction - complexity of algorithms - time and space complexity of algorithms using “big oh” notation - recursion: recursive algorithms - analysis of recursive algorithms

Module II (12 hours)

Linear data structures - stacks - queues - lists - stack and queue implementation using array - linked list - linked list implementation using pointers

Module III (12 hours)

Non linear structures: graphs -trees - sets - graph and tree implementation using array linked list - set implementation using bit string, linked list

Module IV (16 hours)

Searching - sequential search - searching arrays and linked lists - 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 - external sort - merge files

Text book

Aho A.V., Hopcroft J.E. & Ullman J.D., Data Structures and Algorithms , Addison Wesley

Referen ce books

1. *Sahni S., Data Structures, Algorithms, & Applications in C++, McGraw Hill*
2. *Wirth N., Algorithms +Data Structures = Programs , Prentice Hall*
3. *Cormen T.H., Leiserson C.E., & Rivest R.L., Introduction to Algorithms , MIT Press*

Sessional work assessment

Assignments	*2x10 = 20*
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Q V - 2 questions A and B of 15 marks fro m module IV with choice to answer any one

CS2K 303 : DISCRETE COMPUTATIONAL STRUCTURES

(common with IT2K 303)

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*

2. Kolman B. & Busby R.C., Discrete Mathematical Structures for Computer Science , Prentice Hall of India

Reference books

1. Liu C.L., Elements of Discrete Mathematics , McGraw Hill
2. Mott J.L., Kandel A. & Baker T.P., Discrete Mathematics for Computer Scientists & Mathematicians , Prentice Hall of India
3. Grimaldi P., Discrete & Combinatorial Mathematics , Addison Wesley
4. Hernstein N., Topics in Algebra, Wiley Eastern

Sessional work assessment

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2 tests 2x15 = 30
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University examination pattern

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Q II - 2 questions A and B of 15 marks fr om module I with choice to answer any one
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Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

CS2K 304 : BASIC ELECTRONICS ENGINEERING

(common with IT2K 304)

3 hours lecture and 1 hour tutorial per week

Module I (15 hours)

Electronic components - concepts of voltage and current sources - energy bands in solids, metals, insulators and semiconductors - intrinsic and extrinsic semiconductors - PN junction theory - V-I characteristics - diode resistance - rectifiers - performance analysis of rectifiers - filters, zener, varactor and power diodes - LEDs transistors - working and amplifying action - characteristics - comparison between CE, CB and CC configurations - CE amplifier, construction of transistors - use of data sheet - thermal runaway - UJT, introduction to FETs

Module II (12 hours)

Transistor biasing - selection of operating point - bias stabilization - different biasing circuits - PNP biasing - small signal amplifiers - single stage amplifier - graphical method - equivalent circuit method - amplifier analysis - FET amplifier - multistage amplifiers - gain analysis - RC coupled amplifier - frequency response - two stage RC coupled amplifier - distortion in amplifiers - classification of amplifiers

Module III (13 hours)

Power amplifiers - single-ended power amplifier - harmonic distortion - push-pull amplifier - tuned voltage amplifier - resonance - single-tuned voltage amplifier - feedback in amplifiers - types of feedback - voltage gain with feedback - negative feedback - oscillators - classification - LC oscillators - RC oscillators - crystal oscillators - astable multivibrator

Module IV (12 hours)

Operational amplifiers - inverting and noninverting amplifiers - adder - voltage follower - differential amplifier - integrator and differentiator - zero-crossing detector - precision diode - peak detector - logarithmic amplifier - square and triangle wave generator - analog computation - active filters

Text books

1. *Bhargava N.N., Kulshreshtha D.C. & Gupta S.C., Basic Electronics & Linear Circuits , Tata McGraw Hill*
2. *Nagarath J., Electronics Analog & Digital , Prentice Hall India*

Reference books

1. *Millman J. & Halkias C.C., Integrated Electronics: Analog & Digital Circuits & Systems , Tata McGraw Hill*
2. *Schilling D.L. & Belove C., Electronic Circuits: Discrete & Integrated , McGraw Hill*

Sessional work assessment

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CS2K 305 : SWITCHING THEORY & LOGIC DESIGN

(common with IT2K 305)

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* - state tables and diagrams

Text books

1. *Biswas N.N., Logic Design Theory , Prentice Hall of India*
2. *Floyd T.L., Digital Funda mentals , Universal Book Stall*

Reference books

1. *Kohavi Z., Switching & Finite Automata Theory , Tata McGraw Hill*
2. *Millman J. & Halkias C.C., Integrated Electronics: Analog & Digital Circuits & Systems , Tata McGraw Hill*

Sessional work assessment

Assignments	*2x10 = 20*
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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

CS2K 306 : ELECTRIC CIRCUITS AND SYSTEMS

(Common with IT2K 306)

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Review of basic circuit concepts - node and mesh analysis, coupled circuits - definition of graph, cut sets and loops - trees incidence matrix - applications of graph theoretic methods for the formation of network equations - application of Laplace transform for the solution of differential equations

Module II (12 hours)

Review of network theorems - transient analysis of RL, RC and RLC circuits - concept of time constant - Polyphase circuit - 3 phase circuit with balanced and unbalanced loads - star-delta transformation

Module III (12 hours)

Bridge circuits - principles of maxwells bridge - wiens bridge adersons bridge and scherring bridge - two port networks - concept of impedence - admittance and hybrid parameters - interconnection of two port networks - driving point and transfer functions - poles and zeros

Module IV (16 hours)

Introduction to systems - systems engineering - block diagram - transfer function - control system characteristics - dynamic responses - feedback control - system response - first and second order systems - system time constants - frequency response - stability analysis using frequency response (bode plot) and using root locus

Text books

1. *Siskind, Electrical Circuits , McGraw Hill*
2. *Smith R.J. & Dorf R.C., Circuits Devices & Systems , John Wiley*

Reference books

1. *Kuo F., Network Analysis & Synt hesis, John Wiley*
2. *Chang D.K., Analysis of Linear Systems .*
3. *Edminister, Electric Circuits, Schaum 's Outline Series , 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 ans wer any one
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Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

CS2K 307(P) : PROGRAMMING LAB

[Common with IT2K 307(P)]

3 hours practicals per week

Set 1 (3 lab sessions)

HCF (Euclid's algorithm) and LCM of given numbers - find mean - median and mode of a given set of 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 - testing whether a given number is prime

Set 2 (2 lab sessions)

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 3 (2 lab sessions)

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

Set 4 (3 lab sessions)

Files: use of files for storing records with provision for insertion - deletion, search, sort and update of a record

Reference books

1. *Schildt H., C: The Complete Reference , Tata McGraw Hill*
2. *Tan H.H. & D'Orazio T.B., C Programming for Engineering & Computer Science , McGraw Hill*
3. *Cormen T.H. et al, Introduction to Algorithms, Prentice Hall of India*

Sessional work assessment

Lab practicals & record		*= 30*
2 tests	*2x10*	*= 20*
Total marks		*= 50*

CS2K 308(P) : ELECTRONICS LAB

[Common with IT2K 308(P)]

3 hours practicals per week

1. Silicon, germanium and zener diode characteristics
2. Characteristics of UJT and UJT relaxation oscillator
3. Static transistor characteristics in CE and CB configurations
4. Clipping, clamping, differentiating and integrating circuits
5. Series voltage regulator
6. Frequency response of CE amplifier with and without feedback
7. Emitter follower: measurement of input and output impedance
8. RC phaseshift oscillator
9. Op amp: inverting and noninverting amplifier, voltage follower
10. Op amp: differential amplifier

Reference books

1. *Millman & Halkias, Integrated Electronics , Tata McGraw Hill*
2. *Bhargava et.al., Basic Electronic Circuits and Linear Circuits , Tata McGraw Hill*

Sessional work assessment

Lab practicals & record		*= 30*
2 tests	*2x10*	*= 20*
Total marks		*= 50*