Department of Computer Science & Informatics

University of Kota, Kota

M.B.S. Marg, Near Kabir Circle, KOTA - 324005

Website: www.uok.ac.in

MCA – V Semester

Tentative Lecture Plan of Paper - 1

MCA 501 – Design and Analysis of Algorithms

(Changes in contents, if any will be notified)

S. No.	Unit	Topics to be Covered	Lecture No.
1	I	Algorithms and structured programming	1-2
2	I	analysing algorithms	3-4
3	I	behaviour of an algorithm	5-6
4	I	Order notations	7-8
5	I	Time and space complexities (polynomial, logrithmic and exponential),	9-10
6	I	average and worst case analysis	11
7	I	lower and upper bounds	12
8	II	Advanced data structures (Intro)	13
9	II	Threaded trees, B-trees	14-15
10	II	Heaps and heapsort	16-17
11	II	sets and relations	18
12	II	Graphs	19-20
13	II	Hashing	21
14	II	Basic search & Traversal Techniques (Breadth first traversals of Graphs)	22-23
15	II	and Depth first traversals of Graphs	24
16	III	Algorithm design strategies: Divide and conquer	25-26
17	III	Mergesort,	27
18	III	Quicksort,	28
19	III	matrix multiplication	29
20	III	Greedy method: General method	30
21	III	knapsack problem,	31-32
22	III	job sequencing with deadlines	33
23	III	minimum cost spanning trees.	34
24	III	Dynamic programming (0/1 knapsack, travelling salesman problem)	35
25	IV	Backtracking (8 - Queens problem, Sum of Subsets, Graph coloring, 0/1 Knapsack).	36-38
26	IV	Branch & Bound (0/1 knapsack, Travelling salesman).	39-40
27	V	Approximation algorithms: Polynomial Time Approximation Schemes. - Cook's theorem, NP completeness reductions.	41-42
28	V	Complexity: - NP-Hard and NP-complete Problems	43-44
29	V	Cook's theorem, NP completeness reductions.	45-46

Text/Reference Books:

1. E. Horowitz, S. Sahani, Fundamentals of Computer Algorithms, Galgotia Publications, 1985.
2. Aho, J.E. Hopcroft, & J.D. Ullman, Design & Analysis of Computer Algorithms, Addition Wesley, 1974.
3. P.Berlions & P. Bizard, Algorithms - The Construction, Proof & Analysis of Programs, John Wiley & Sons, 1986.
4. K. Melhorn, Data Strucures and Algorithms, Vol. I & II, Springer Verlag, 1984.

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MCA – V Semester

Tentative Lecture Plan of Paper - 2

MCA 502 – Wireless Technologies

(Changes in contents, if any will be notified)

S. No.	Unit	Topics to be Covered	Lecture No.
1	I	Introduction to wireless Communication System: Evolution	1
2	I	Generations of wireless communication	2
3	I	Wireless transmission concepts: Frequencies, signals, Antennas.	3
4	I	Comparison of wireless communication system: Land- Mobile technologies (GSM, CDMA)	4-5
5	I	Satellite, Personal Communication Systems	6-7
6	II	Wireless MAC Protocols: S/F/T/CDMA	8-10
7	II	CSMA protocols	11-12
8	II	specialized MAC, Cellular Systems	13-14
9	II	Spread Spectrum: DSSS & FHSS	15-16
10	II	Wireless WAN (GSM: Mobile Service	17
11	II	GSM architecture	18
12	II	Radio Interface, Protocols, Localization & Calling,	19-20
13	II	Handover & security)	21
14	III	Wireless LAN: IEEE 802.11 b/a/g:.	22-23
15	III	System architecture, Protocol architecture,	24-25
16	III	MAC management;	26
17	III	introduction to HIPERLAN	27
18	III	Concept of Bluetooth - IEEE 802.16.	28
19	IV	Mobile IP – Packet delivery – Registration process	29-30
20	IV	Tunnelling and Encapsulation	31
21	IV	Routing protocols, DHCP	32-33
22	IV	Unicast & multicast Communication	34
23	IV	Wireless TCP- Indirect, Snooping & mobile TCP	35-36
24	IV	Introduction to wireless PAN	37
25	V	Ad-Hoc Networks-Infrastructure and Ad-Hoc networks	38
26	V	Routing algorithms	39-40
27	V	Support for mobility WAP, WAP architecture	41-42
28	V	Transport Security – Transaction protocol, Session protocol	43-44
29	V	Introduction to pervasive computing- Applications, Devices, Software	45-46

Text/Reference Books:

1. Jochen Schiller. Mobile Communications, Pearson Education
2. Stojmenovic Ivan, HandBook of Wireless Networks and Mobile Computing, John Wiley & Sons
3. Theodore S. Rappaport, Wireless Communications: Principles and Practice, Second Edition, Prentice Hall. 2002.
4. Chander Dhawan, Mobile Computing- A System Integrator's Approach, McGraw-Hill

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MCA – V Semester

Tentative Lecture Plan of Paper - 3

MCA 503 – Compiler Design

(Changes in contents, if any will be notified)

S. No.	Unit	Topics to be Covered	Lecture No.
1	I	Introduction to translators, compilers, interpreters	1
2	I	compilation process	2
3	I	Programming language, grammars, derivations, reductions, regular expression	3-4
4	I	context free language and grammar	5
5	I	*Lexical analyzer:* input buffering, specification and recognition of tokens,	6-7
6	I	introduction to finite automata, regular expressions to NFA	8-9
7	I	minimization of DFA, keywords and reserve word policies	10-11
8	I	LEX – the lexical analyzer generator. Error Handling	12-13
9	II	*Syntax analyzer:* context free grammars, top down parsing	13-14
10	II	brute force parser, recursive descent parser, LL(1) parser	15-16
11	II	Bottom up parsing, operator precedence parsing,	17
12	II	simple precedence parsing	18
13	II	LR parser, LALR parser, YACC – the parser generator	19-20
14	III	*Syntax directed translation schemes*: implementation of syntax directed translators	21-22
15	III	synthesized attributes, inherited attributes, dependency graph,	23
16	III	evaluation order, construction of syntax trees, directed acyclic graph of expression	24-25
17	III	bottom up evaluation of S- attributed definitions, L-attributed definitions	26-27
18	III	top down translation of L - attributed definitions	28
19	III	Errors, lexical phase errors, syntactic phase errors	29
20	III	Intermediate languages, postfix notation, syntax trees, parse trees	30
21	III	three address code, triples and indirect triples	31
22	IV	Translation of assignment statements, Boolean expressions,	32
23	IV	statements that alter flow of control, array references, procedure calls	33-34
24	IV	declarations, case statement, record structures.	36
25	IV	*Symbol tables*: operation on symbol tables, symbol table organization for non-block structured languages, symbol table organization for block – structured languages.	37-38
26	V	Run time storage management, storage allocation and referencing data in block structured language, storage allocation.	39-41
27	V	*Code optimization*: sources of optimization, loop optimization, DAG and optimization of basic blocks.	42-43
28	V	Code generation, a machine model, next use information register allocation and assignment, a simple code generator, code generation from DAG's, Peephole optimization.	44-46

Text/Reference Books:

1. Aho, Ullman; Principles of Compiler Design , Narosa Publishing House, 1989
2. Aho, Sethi, Ullman;Compilers : Principles, techniques and tools , Wesley 1988
3. Barrat, Eates, Cought: Compiler Construction : Theory & Practice, Galgotia 1988
4. Trembly & Sorenson Compiler Writing ; Mc-Graw Hill Book Co.
5. Gries Compiler Construction for Digital Computer ; John Willey & Sons, New York - 1987

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MCA – V Semester

Tentative Lecture Plan of Paper - 4

MCA 504 – Distributed Computing

(Changes in contents, if any will be notified)

S. No.	Unit	Topic	Lecture No.
1.	I	Introduction of Distributed Operating System	1
2.	I	Distributed Computing system models	2-3
3.	I	Issues in design of distributed operating system	4-6
4.	I	Message passing	7-8
5.	I	Remote Procedure Calls	9-10
6.	I	Synchronization.	11-12
7.	II	Process management,	13-14
8.	II	Resource management,	15-16
9.	II	Distributed file systems.	17-18
10.	II	Introduction to distributed data-bases	19-20
11.	III	Distributed Algorithms: Introduction to distributed algorithms,	21-22
12.	III	Synchronous and partial synchronous models,	23-24
13.	III	Algorithms in general synchronous leader election,	25-27
14.	III	Breadth first search, shortest path, randomized algorithms	28-29
15.	IV	Distributed concensus with link and process failures.	30
16.	IV	Asynchronous system model, I/O automata,	31
17.	IV	Operation of automata, complexity measures,	32
18.	IV	Randomizations,	33
19.	IV	Asynchronous shared memory model,	34
20.	IV	Mutual exclusion, resource allocation and concensus	35
21.	V	Asynchronous network model	36-37
22.	V	Basic asynchronous network algorithms,	38-39
23.	V	Shared memory Vs Networks.	40
24.	V	Introduction to parallel distributed processing: general framework, methods of learning	41-43
25.	V	Problem Solving	44-45

Text/Reference Books

1.. PK Sinha, Distributed Operating System, PHI, 1997.

2. A S Tanenbaum, Modern Operating Systems, PHI.

3. Nancy A Lynch, Distributed Algorithms, Morgan Kaufmann Pub. Inc., 1996.

4. DF Rumelhart, JI Mc Clelland & PDP group, Parallel Distributed Processing vol I&II, MIT Press, 1995.

5. Simon Haykin, Neural Networks, IEEE Press.