Syllabus for Ph.D Entrance Test , RGPV.

Common for CSE/IT/CA

Algorithms: Algorithms and complexity; Combinatorics and graph theory; Geometric Algorithms, Parallel and Distributed Algorithms, Randomized Algorithms, Algorithms for Biometric Based Identification, Computational Biology, Bioinformatics and streaming data.

Computer Architecture : Embedded systems , Parallel and Distributed Computation, Embedded Computing Design ,Parallel Computing Structures , Parallel Algorithm for Array processors , Scheduling and load balancing in multiprocessor Systems , Multiprocessing control and algorithm, Real time and fault Tolerant Computing.

Computer Networks: Performance modeling, Routers and routing, analysis and design of wired and wireless networks, MAC sub layer, Wireless sensor networks: Implementation and verification of network security protocols, data management, communication and energy efficiency issues in Sensor Networks, Design of content distribution networks for data dissemination, Network algorithms, Quality of service protocols, Mobile Computing, Voice Routing, Voice over IP, RFID networks, Enterprise networks, Access and Broadband networks, Hyper media. Protocols, Network performance and analysis, IPv6, Internet Technologies, Cryptography, Biometrics ,Intrusion Detection System and Firewalls.

Software Engineering : Object oriented software development; Component architectures. Reengineering of software; systems analysis and design; MIS systems; Project management; Decision Support System , Quality assurance , Software Testing , Metrics and Models for Software Architecture, Software Fault Tolerance ,Quantitative approaches to project-and process management, Design Methodologies, Formal Specification .

Database Management Systems : Object oriented, temporal and parallel databases; Query optimization and transaction management; Real time databases systems, indexing multidimensional data, distributed database systems; data dissemination systems; data warehousing and mining . Integrated mining with relational DBMS, Temporal mining, Integrating mining with OLAP.

Specific to CSE

Artificial Intelligence & Soft Computing : Natural language processing , Machine Learning and Neural Networks, Fuzzy Systems, Pattern Recognition and Text Processing, Intelligent systems and their applications , Intelligent interfaces. Swarm Intelligence ,Genetic Algorithm . Robotics and Kinematics .

System Programming and Principles of Programming languages : Functional and logic programming languages, Theory of programming languages , Programming Environments, Translators for Declarative and Functional Languages, Analysis and implementation of functional and logic programming languages, Automatic Generation of Compilers, Compilers for Non conventional Architectures, Code Optimization, Theory of code optimization; Optimizing and parallelizing compilers , Complexity Theory, Logic in Computer Science, Algorithmic information theory, Computational number theory, Applications of grid Computing

Computer Graphics : Computer Vision and Image Understanding ,Computer aided graphics design, High Performance computing, Visualization; Rendering, Image and video retrieval; motion capture; point based methods ,Virtual Reality

Operating Systems: Processes, Interprocess communication, Memory management, Concurrent processing, synchronization, Scheduling, File systems, Protection and Security, Distributed Operating System. Real time operating System, Network Operating System .

Simulation & Modelling: Statistical independence, Bernoulli Process, Renewal Process, Random Incidence, Markov Modulated Bernoulli Process, Irreducible Finite Chains with Aperiodic States, Discrete-Time Birth-Death Processes, Markov property, Finite Markov Chains, Continuous time Markov chain, Hidden Markov Model. Characteristics of queuing system, poisson's formula, breadth-death system, equilibrium of queuing system, analysis of M/M/1 queues, FSM, Petri-net Model.

Web Engineering :Web Engineering Models, Web Servers , Architecture of browser and search engines, Web Security issues , security audit of websites , web effort estimation , productivity ,Measurement , Quality usability and reliability ,Semantic web, Ontology .XML , HTML , DHTML, SGML .

Specific to IT

Web technology & E Commerce: Electronic Commerce and physical Commerce, Different type of e-commerce, e-commerce scenarios, advantages of e-commerce. Business models: Feature of B2B e-commerce, Business models, Integration. E-Services: category of e-services, Web- enabled services, Matchmaking services, information-selling on the web. Internet payment system , SET Protocol for credit card payment , E-Governance ,WAP Architecture.

Information Theory Coding : Information Measures, Review probability theory, Random variables, Processes, Mutual Information, Entropy, Uncertainty, Shannon's theorem, redundancy, Huffman Coding, Discrete random Variable. Gaussian random variables, Bounds ,Linear block codes , cyclic codes ,BCH codes , Reed-Solomon codes, space time codes, concatenated codes, turbo coding and LDPC codes .

Mobile & Pervasive Computing: Mobile computing , Adaptability , Mobility Management ,Context –Aware Computing and its applications , Introduction to Ad Hoc and Sensor Networks , Approaches to Security

Data Mining: Data integration models and algorithms, Graphical models, Information extraction and retrieval, Forecasting and smart e-business, Sensor and Bioinformatics data mining, Text and Web data mining.

Multimedia and Animation : High Performance computing; Visualization; Rendering; Animation; Image and video retrieval; motion capture; point based methods.

Middleware Technologies: Exposure to Markup languages, HTML,DHTML, VRML, SGML, XML etc. CGI, Applets & Servlets , Distributed objects, object request brokers, component technology ,CORBA .

Specific to Computer Application:

Discrete Mathematics : Set, Posets, Relations, Recurrence relations, Functions, Combinatories, Lattices, Boolean Algebra

Numerical Methods : Numerical solution of linear and non-linear equations, Interpolation, Numerical Differentiation & Integration, Numerical solution of ordinary and partial differential equations

Statistical Methods : Theory of Probability, Binomial, Poisson & Normal Distributions, Correlation and Regression, Tests of Hypothesis.

Optimization : Linear programming and its solution, Project Management: CPM & PERT, Queuing models, Inventory models, Assignments & Transportation Problems, Dynamic Programming

Web technology & E Commerce : Electronic Commerce and physical Commerce, Different type of e-commerce, e-commerce scenarios, advantages of e-commerce. Business models: Feature of B2B e-commerce, Business models, Integration. E-Services: category of e-services, Web- enabled services, Matchmaking services, information-selling on the web. Internet payment system , SET Protocol for credit card payment , E-Governance ,WAP Architecture.

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