

NCS- 505 Computer Architecture		2 1 0
Unit	Topic	Proposed Lectures
I	<p>Introduction: Digital computer generation, computer types and classifications, functional units and their interconnections, buses, bus architecture, types of buses and bus arbitration. Register, bus and memory transfer.</p> <p>Central Processing Unit: Addition and subtraction of signed numbers, look ahead carry adders. Multiplication: Signed operand multiplication, Booths algorithm and array multiplier. Division and logic operations. Floating point arithmetic operation Processor organization, general register organization, stack organization and addressing modes.</p>	8
II	<p>Control Unit: Instruction types, formats, instruction cycles and subcycles (fetch and execute etc) , micro-operations, execution of a complete instruction. Hardwire and microprogrammed control: microprogramme sequencing, wide branch addressing, microinstruction with next address field, pre-fetching microinstructions, concept of horizontal and vertical microprogramming.</p>	8
III	<p>Memory: Basic concept and hierarchy, semiconductor RAM memories, 2D & 2 1/2D memory organization. ROM memories. Cache memories: concept and design issues 9 performance, address mapping and replacement) Auxiliary memories: magnetic disk, magnetic tape and optical disks Virtual memory: concept implementation.</p>	8
IV	<p>Input / Output: Peripheral devices, I/O interface, I/O ports, Interrupts: interrupt hardware, types of interrupts and exceptions. Modes of Data Transfer: Programmed I/O, interrupt initiated I/O and Direct Memory Access., I/O channels and processors. Serial Communication: Synchronous & asynchronous communication, standard communication interfaces.</p>	8

TEXT BOOK:

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer Organization", Fifth Edition, Tata McGraw Hill, 2002.
2. William Stallings, "Computer Organization and Architecture – Designing for Performance", Sixth Edition, Pearson Education, 2003.

REFERENCE BOOKS:-

1. Patterson, Computer Organisation and Design, Elsevier Pub. 2009
 2. Vravice, Hamacher & Zaky, "Computer Organization", TMH
 3. Mano, "Computer System Architecture", PHI
 4. John P Hays, " Computer Organization", McGraw Hill
 5. Tannenbaum, " Structured Computer Organization", PHI 6.
- P Pal chaudhry, ' Computer Organization & Design', PHI

RUC501 /RUC601		CYBER SECURITY	L-T-P: 3-0-0
Unit	Topic	Proposed Lecture	
I	Introduction- Introduction to Information Systems, Types of Information Systems, Development of Information Systems, Introduction to Information Security, Need for Information Security, Threats to Information Systems, Information Assurance, Cyber Security, and Security Risk Analysis.	08	
II	Application Security- (Database, E-mail and Internet), Data Security Considerations-Backups, Archival Storage and Disposal of Data, Security Technology-Firewall and VPNs, Intrusion Detection, Access Control. Security Threats -Viruses, Worms, Trojan Horse, Bombs, Trapdoors, Spoofs, E-mail Viruses, Macro Viruses, Malicious Software, Network and Denial of Services Attack, Security Threats to E-Commerce- Electronic Payment System, e- Cash, Credit/Debit Cards. Digital Signature, Public Key Cryptography	08	
III	Developing Secure Information Systems- Application Development Security, Information Security Governance & Risk Management, Security Architecture & Design Security Issues in Hardware, Data Storage & Downloadable Devices, Physical Security of IT Assets, Access Control, CCTV and Intrusion Detection Systems, Backup Security Measures.	08	
IV	Security Policies- Development of Policies, WWW Policies, Email Security Policies, Policy Review Process-Corporate Policies-Sample Security Policies, Publishing and Notification Requirement of the Policies. Evolving Technology Security – Mobile, Cloud, Outsourcing, SCM.	08	
V	Information Security Standards- ISO, IT Act, Copyright Act, Patent Law, IPR. Cyber Laws in India; IT Act 2000 Provisions, Intellectual Property Law: Copy Right Law, Software License, Semiconductor Law and Patent Law. Case Study – Corporate Security	08	
References:			
<ol style="list-style-type: none"> 1. Charles P. Pfleeger, Shari Lawerance Pfleeger, “Analysing Computer Security”, Pearson Education India. 2. V.K.Pachghare, “Cryptography and information Security”, PHI Learning Private Limited, Delhi India. 3. Sarika Gupta & Gaurav Gupta, Information Security and Cyber Laws, Khanna Publishing House 4. Anshul Kaushik, Cyber Security, Khanna Publishing House 5. Dr.Surya Prakash Tripathi, Ritendra Goyal, Praveen Kumar Shukla ,”Introduction to Information Security and Cyber Law” Willey Dreamtech Press. 6. Michael E.Whitman and Herbert J Mattord "Principle of Information Security" Cengage 7. Mike Chapple and David Seidl "Cyberwarfare: Information operations in a connected world" Jones & Bartlett Learning 8. Schou, Shoemaker, “Information Assurance for the Enterprise”, Tata McGraw Hill. 9. CHANDER, HARISH,” Cyber Laws And It Protection ” , PHI Learning Private Limited ,Delhi 10. V.K. Jain, Cryptography and Network Security, Khanna Publishing House, Delhi 			

RCS-502: Design and Analysis of Algorithm		3-1-0
Unit	Topic	Proposed Lecture
I	Introduction: Algorithms, Analyzing Algorithms, Complexity of Algorithms, Growth of Functions, Performance Measurements, Sorting and Order Statistics - Shell Sort, Quick Sort, Merge Sort, Heap Sort, Comparison of Sorting Algorithms, Sorting in Linear Time.	08
II	Advanced Data Structures: Red-Black Trees, B – Trees, Binomial Heaps, Fibonacci Heaps, Tries, Skip List	08
III	Divide and Conquer with Examples Such as Sorting, Matrix Multiplication, Convex Hull and Searching. Greedy Methods with Examples Such as Optimal Reliability Allocation, Knapsack, Minimum Spanning Trees – Prim’s and Kruskal’s Algorithms, Single Source Shortest Paths - Dijkstra’s and Bellman Ford Algorithms.	08
IV	Dynamic Programming with Examples Such as Knapsack. All Pair Shortest Paths – Warshal’s and Floyd’s Algorithms, Resource Allocation Problem. Backtracking, Branch and Bound with Examples Such as Travelling Salesman Problem, Graph Coloring, n-Queen Problem, Hamiltonian Cycles and Sum of Subsets.	08
V	Selected Topics: Algebraic Computation, Fast Fourier Transform, String Matching, Theory of NP-Completeness, Approximation Algorithms and Randomized Algorithms	08

References:

1. Thomas H. Cormen, Charles E. Leiserson and Ronald L. Rivest, “Introduction to Algorithms”, Prentice Hall of India.
2. E. Horowitz & S Sahni, "Fundamentals of Computer Algorithms",
3. Aho, Hopcraft, Ullman, “The Design and Analysis of Computer Algorithms” Pearson Education, 2008.
4. LEE "Design & Analysis of Algorithms (POD)", McGraw Hill
5. Gajendra Sharma, Design & Analysis of Algorithms, Khanna Publishing House
6. Richard E. Neapolitan "Foundations of Algorithms" Jones & Bartlett Learning
7. Jon Kleinberg and Éva Tardos, Algorithm Design, Pearson, 2005.
8. Michael T Goodrich and Roberto Tamassia, Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Wiley, 2006.
9. Harry R. Lewis and Larry Denenberg, Data Structures and Their Algorithms, Harper Collins, 1997
10. Robert Sedgewick and Kevin Wayne, Algorithms, fourth edition, Addison Wesley, 2011.
11. Harsh Bhasin, "Algorithm Design and Analysis", First Edition, Oxford University Press.
12. Gilles Brassard and Paul Bratley, Algorithmics: Theory and Practice, Prentice Hall, 1995.

B. Tech. (CSE\CSIT)
FIFTH EMESTER (DETAILED SYLLABUS)

RCS-501:Database Management Systems		3-0-0
Unit	Topic	Proposed Lecture
I	Introduction: Overview, Database System vs File System, Database System Concept and Architecture, Data Model Schema and Instances, Data Independence and Database Language and Interfaces, Data Definitions Language, DML, Overall Database Structure. Data Modeling Using the Entity Relationship Model: ER Model Concepts, Notation for ER Diagram, Mapping Constraints, Keys, Concepts of Super Key, Candidate Key, Primary Key, Generalization, Aggregation, Reduction of an ER Diagrams to Tables, Extended ER Model, Relationship of Higher Degree.	08
II	Relational data Model and Language: Relational Data Model Concepts, Integrity Constraints, Entity Integrity, Referential Integrity, Keys Constraints, Domain Constraints, Relational Algebra, Relational Calculus, Tuple and Domain Calculus. Introduction on SQL: Characteristics of SQL, Advantage of SQL. SQL Data Type and Literals. Types of SQL Commands. SQL Operators and Their Procedure. Tables, Views and Indexes. Queries and Sub Queries. Aggregate Functions. Insert, Update and Delete Operations, Joins, Unions, Intersection, Minus, Cursors, Triggers, Procedures in SQL/PL SQL	08
III	Data Base Design & Normalization: Functional dependencies, normal forms, first, second, 8 third normal forms, BCNF, inclusion dependence, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design	08
IV	Transaction Processing Concept: Transaction System, Testing of Serializability, Serializability of Schedules, Conflict & View Serializable Schedule, Recoverability, Recovery from Transaction Failures, Log Based Recovery, Checkpoints, Deadlock Handling. Distributed Database: Distributed Data Storage, Concurrency Control, Directory System.	08
V	Concurrency Control Techniques: Concurrency Control, Locking Techniques for Concurrency Control, Time Stamping Protocols for Concurrency Control, Validation Based Protocol, Multiple Granularity, Multi Version Schemes, Recovery with Concurrent Transaction, Case Study of Oracle.	08

References:

1. Korth, Silbertz, Sudarshan," Database Concepts", McGraw Hill
2. Date C J, "An Introduction to Database Systems", Addison Wesley
3. Elmasri, Navathe, " Fundamentals of Database Systems", Addison Wesley
4. O'Neil, Databases, Elsevier Pub.
5. RAMAKRISHNAN"Database Management Systems",McGraw Hill
6. Leon & Leon,"Database Management Systems", Vikas Publishing House
7. Bipin C. Desai, " An Introduction to Database Systems", Gagotia Publications
8. Majumdar & Bhattacharya, "Database Management System", TMH
9. R.P. Mahapatra, Database Management System, Khanna Publishing House

9. Course on 'PHP & MySQL', Spoken Tutorial MOOC

RAS501 Managerial Economics		L-T-P: 3-0-0
Unit	Topic	Proposed Lecture
I	Introduction of Engineering Economics and Demand Analysis: Meaning and nature of Economics, Relation between science, engineering, technology and economics; Meaning of Demand, Determinants of Demand, Shifts in demand, Law of Demand, Price Elasticity of Demand &Types, Income Elasticity, Cross price Elasticity, Determinants of Elasticity, uses and importance of elasticity.	06
II	Concept of Supply: Law of Supply, Factors affecting Supply, Elasticity of supply. Demand Forecasting: Introduction, Meaning and Forecasting, Methods or Techniques of Demand Forecasting, Criteria for Good Demand Forecasting, Demand Forecasting for a New Product;	06
III	Cost Analysis- Introduction, Types of Costs, Cost-Output Relationship: Cost Function, Cost-Output Relationships in the Short Run, and Cost-Output Relationships in the Long Run; Short run and long run, Break- Even Analysis; Production functions: laws of variable proportions, law of returns; Economies of scale: Internal and external.	06
IV	Market Structure: Market Structure Perfect Competition, Imperfect competition – Monopolistic, Oligopoly, duopoly sorbent features of price determination and various market conditions.	06
V	Nature and characteristics of Indian economy, concepts of LPG, elementary concepts of National Income, Inflation and Business Cycles ,Concept of N.I. and Measurement., Meaning of Inflation, Types and causes , Phases of business cycle .Investment decisions for boosting economy(National income and per capital income)	06
References:		
<ol style="list-style-type: none"> 1. Premvir Kapoor, Sociology and Economics for Engineers, Khanna Publishing House (Edition 2018) 2. Salvatore D, “Principles of Microeconomics”, Oxford University Press. 3. Koutsoyiannis A, “Modern Microeconomic”, Macmillan Education Ltd. 4. Dwivedi DN, “Principles of Microeconomics”, Pearson Education. 5. Cowell, FA, “Microeconomic Principles and Analysis”, Oxford University Press. 		

RCS-503: Principles of Programming Languages		3-0-0
Unit	Topic	Proposed Lecture
I	Introduction: Role of Programming Languages: Why Programming Languages, Towards Higher-Level Languages, Programming Paradigms, Programming Environments Language Description: Syntactic Structure, Language Translation Issues: Programming Language Syntax, Stages in Translation, Formal Translation Models	08
II	Data, Data Types, and Basic Statements : Names , Variables , Binding, Type Checking, Scope, Scope Rules , Lifetime and Garbage Collection, Primitive Data Types, Strings, Array Types, Associative Arrays ,Record Types, Union Types, Pointers and References , Arithmetic Expressions , Overloaded Operators, Type Conversions , Relational and Boolean Expressions, Assignment Statements, Mixed Mode Assignments, Control Structures, Selection ,Iterations, Branching, Guarded Statements	08
III	Subprograms and Implementations : Subprograms, Design Issues, Local Referencing, Parameter Passing, Overloaded Methods, Generic Methods, Design Issues for Functions , Semantics of Call and Return, Implementing Simple Subprograms, Stack and Dynamic Local Variables, Nested Subprograms, Dynamic Scoping.	08
IV	Object-Orientation, Concurrency, and Event Handling : Grouping of Data and Operations — Constructs for Programming Structures, Abstraction Information Hiding, Program Design with Modules, Defined Types, Object Oriented Programming — Concept of Object, Inheritance, Derived Classes and Information Hiding – Templates, Semaphores, Monitors, Message Passing, Threads, Statement Level Concurrency Exception Handling (Using C++ and Java as Example Language).	08
V	Functional and Logic Programming Languages : Introduction to Lambda Calculus , Fundamentals of Functional Programming Languages, Programming with Programming with ML, Introduction to Logic and Logic Programming – Programming with Prolog.	08

References:

1. “Programming Languages: Design and Implementations” , Terrance W.Pratt, Marvin V. Zelkowitz, T.V.Gopal, Fourth ed., Prentice Hall
2. “Programming Language Design Concept”, David A. Watt, Willey India
3. “Programming languages: Concepts and Constucts”, Ravi Sethi, Second Ed.,Pearson.
4. “Types and programming Languages”, Benjamin C. Pierce. The MIT Press Cambridge, Massachusetts London, England
5. Concepts of Programming Languages, Robert W. Sebesta, 10th Ed.,Pearson