**HU401: ENGINEERING ECONOMICS**

**Credits: 03**

**L-T-P: 3-0-0**

**Unit I**

Definition of Economics, Consumer behavior, Utility analysis and demand analysis, Kinds of Demand, Law of Demand and Law of Supply, Elasticity of Demand: Types and Measurement, Scope of Economics including economics of environment and e-commerce.

**Unit II**

Market forms-Perfect and Imperfect markets, Features of Perfect competition, Monopoly and Monopolistic competition. Price and output determination under Perfect Competition, Monopoly, Monopolistic and Oligopoly etc., Concept of Production function, Cost Analysis, Estimation of cost function-Profit and Break Even Analysis.

**Unit III**

National Income, GNP and NNP, Per-Capita Income, Source of Public Revenue-Tax Revenue and Non-Tax Revenue, Direct and Indirect Tax.Inflation and Deflation. Banking-Definition - Types of Banks. Concept of Investment Analysis

**Unit IV**

Features of Indian Economy, Planning in India, Objectives.Economic Reforms in India-Concept of Economic Liberalization, Privatization and Globalization.Unemployment Problem in India-Types, Causes and remedial measures.

**Unit V**

International Trade, Gains from International Trade, The World Trading Environment and Multinational Corporations, BPO etc., Function and Role of IMF, World Bank and WTO. Concept of Stock Exchange Market and Market for Securities.

**Text Books/Reference Book:**

1. M.L. Jhingan—**Micro Economic Theory**
2. Sumitra Paul-**Managerial Economics**
3. Joel Dean—**Managerial Economics**

 **IT401:** **Object Oriented Programming & Design**

 **L-T-P: 3 -1- 0**

 **Credits: 4**

**Unit I:**

Structured Programming and Object Oriented Programming paradigms.
Data Abstraction : Class, object, constructors, destructors, memory allocations for objects, member functions, friend functions, type conversion, namespace.

Memory Management: New, Delete, Pointers to objects, this pointer

**Unit II**
Inheritance : Single & multiple inheritance, virtual base class.
Polymorphism : Compile time polymorphism : operator overloading, function overloading, static binding.
Run-time polymorphism : Virtual function, pure virtual function, abstract class, dynamic binding.

**Unit III:**
Exception handling- Throwing Exceptions, Catching Exceptions, Creating new exceptions; File Handling

**Unit IV:**

Templates and STL: Template Classes, Functions, Iterators, Algorithms

**Unit V:**

Object Oriented Design Approaches, Importance of Modeling, Principles of Modeling, Object Oriented Modeling, Conceptual Model of the UML, Various UML diagrams, Structural Modeling: Class, Object, Component, Deployment Diagrams; Behavioral Modeling: Use Case, State-Chart, Activity, Interaction Diagrams-Sequence and Collaboration Diagrams; Design of a complete system by using all the diagrams.

**Text Books/References:**

1. Herbert Schild, **The Complete Reference to C++**, Osborne McGrawHill.

2. H M Deitel, P J Deitel, **C++ How to Program**, PHI, 1998

3. Lafore Robert, **Object Oriented Programming in Turbo C++**, Galgotia Publications

4. Bjarne Stroustrup, **The C++ Programming Language**, Special Edition, Pearson Education

5. K R Venugopal, Rajkumar Buyya, T Ravishankar, **Mastering C++**, TMG

6. E. Balaguruswamy, **Object Oriented Programming in C++**, TMG
7. James Rambaugh, Micheal Blaha, William Premerlani, Federick Eddy, William Loorenson,

 **Object Oriented Modeling and Design**, PHI.

8. Grady Booch, **Object-Oriented Analysis and Design with Applications**, Second Edition,

 Addison-Wesley Publishing Company

**IT402::Database Management systems**

**L-T-P: 3-1-0**

**Credits: 4**

**Unit I:**

*Introduction***:**

Data Base System Concepts and architecture, Data models, scheme and instances, Data independence Data base language and Interface.

**Unit II:**

*Data Modelling Using the Entity-Relationship Model*

ER model concepts, Notations for ER diagram, Extended E.R. model, Relation-ships of higher degree.

**Unit III:**

*Relational Data Model and Languages*

Relational data Model concepts, constraints, relational algebra.Relational Caculus, Tuple and Domain calculus.SQL, data definitions queries and up-dates in SQL, QBE, Data definitions, queries and up-dates in QBE.

Example DBMS System (ORACLE/INGRESS/SYBASE)

Basic architecture.Data definitions Data Manipulation.

**Unit IV:**

*Database Design*

Functional dependencies, Normal forms, First, second, and third functional personal normal forms, BCNF, Multivalued dependencies Fourth Normal form, Join Dependencies and fifth Normal form, Inclusion Dependencies.

**Unit V:**

*Query Processing and Optimization*

Algorithms for executing query operations, Heuristics for query optimisations.

**Unit VI:**

*Transaction Processing Concepts*

Transaction and system concepts, schedules and Recoverability seriazability of schedules.

**Unit VII:**

*Concurrency Control Techniques*

Locking Techniques for concurrency control Time stamping and concurrency control.

**Text Books & References**

1. Elmasri, RamexShamkant B. Navathe,” **Fundamentals of Data base Systems**".

2. Jeffry D. Ulman, "**Principles of Data Base Systems**", Second Edition Galgotia Pub.

3. Date, C.J. "**An Introduction to Database System**", Vol. I, II &IIIrd, Addison-Welsey.

4. Prakash, Naveen., "**Introduction to Database Management**", Tata McGraw Hill

**IT403::Computer Networks**

**L-T-P: 3-1-0**

**Credits: 4**

**Unit I**

*Medium Assess Control*:

MAC addresses, Channel Allocation Problem-Static and Dynamic channel allocation; Multiple access-ALOHA, Slotted ALOHA, CSMA, CSMA/CD, token ring, token bus; Collision free protocols; Limited contention protocols.

**Unit II**

*Network Layer:*

Circuit switching – Packet switching – Virtual circuit switching – IP – ARP – RARP –

DHCP – ICMP – Routing algorithms-static and Dynamic Routing – RIP – OSPF – Subnetting – CIDR –NAT-Interdomain routing – BGP – IPv6 – Multicasting – Congestion avoidance in network layer

**Unit III**

*Transport Layer:*

UDP – TCP – Flow control – Congestion control – Queueing discipline – Congestion

avoidance – QoS – RPC-SCTP

**Unit IV**

*Application Layer*

Email (SMTP, MIME, POP3, IMAP) – HTTP(S) – DNS- SNMP – Telnet – FTP – TFTP

**Unit V**

*Wireless Network:*

Adhoc network-Infrastructure based wireless Network, Introduction to Sensor Network, MANET-Introduction, issues, Routing Algorithms.

**Unit VI**

*Network Security:*

Private Key Cryptography, Public key cryptography, public key cryptography algorithm - RSA, digital signatures, digital Certificates, Introduction to Kerberos, Hashing Techniques

**Books/References:**

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| --- |
| 1. W. Stallings, **Data and Computer Communications**, 8th Ed, Pearson India, 2007.2. B. Forouzan, **Data Communications and Networking**, 4th Ed, Tata Mcgraw Hill, 2006. |
| 3. A. S. Tanenbaum, **Computer Networks**, 4th Ed, Pearson India, 2003..4. P. C. Gupta, **Data Communications and Computer Networks**, 2nd Ed, Prentice Hall of India, 2009.5. D. E. Comer, **Internetworking** **with TCP-IP: Principles, Protocols and Architecture** , Vol I, 2nd Edition, Prentice Hall, 1991.6. D. E. Comer and D. L. Stevens. **Internetworking with TCP-IP: Design, Implementation, and Internals**, Vol II, Prentice Hall, 1990.7. D. Bertsekas and R. Gallagar.**Data Networks**, 2nd Edition, Prentice Hall, 1992.8. W. R. Stevens.**UNIX Network Programming**, Prentice Hall, 1990. |

**IT 404::System programming**

 **L-T-P: 3-0-0**

 **Credits: 3**

**Unit-I**

Evolution of Components Systems Programming, Assemblers, Loaders, Linkers, Macros, Compilers. Software tools, Text editors, Interpreters and program generators, Debug Monitors, Programming environment.

**Unit-II**

*Compiler*:

Brief overview of compilation process, Incremental compiler, Assembler: Problem statement, single phase and two phase assembler, symbol table; Loader schemes, compile and go Loader, general loader schemes, absolute loader, Subroutine linkage, Reallocating loader, Direct linkage Loader, Binders, Linking loader, overlays.

**Unit-III**

Macro language and macro-processor, macro instructions, features of macro facility, macro instruction arguments, conditional macro expansion, macro calls with macro instruction defining macros.

**Unit-IV**

Theoretical Concept of Unix Operating System: Basic features of operating system; File structure: CPU scheduling; Memory management: swapping, demand paging; file system: block and fragments, i-nodes, directory structure; User to user communication.

**Unit-V**

Getting Started with Unix: User names and groups, logging in; Format of Unix commands; Changing your password; Characters with special meaning; Unix documentation; Files and directories; Current directory, looking at the directory contents, absolute and relative pathnames, some Unix directories and files; Looking at the file contents; File permissions; basic operation on files; changing permission modes; Standard files, standard output; Standard input, standard error; filters and pipelines; Processes; finding out about processes; Stopping background process; Unix editor vi.

**Unit-VI**

Test Manipulation: Inspecting files; File statistics; Searching for patterns; Comparing files; Operating on files; Printing files; Rearranging files; Sorting files; Splitting files; Translating characters; AWK utility.

**Unit-VII**

Shell Programming: Programming in the Borne and C-Shell; Wild cards; Simple shell programs; Shell variables; Shell programming constructs; interactive shell scripts; Advanced features.

System Administration: Definition of system administration; Booting the system; Maintaining user accounts; File systems and special files; Backups and restoration; Role and functions of a system manager.

Overview of the linux. operating system

**Text Books/ Reference Books:**

1. **Systems Programming** *by Donovan, TMH.*
2. **The unix programming environment** *by Brain Kernighen & Rob Pike, 1984, PHI & Rob Pike.*
3. **Design of the Unix operating system** *by Maurich Bach, 1986, PHI.*
4. **Introduction to UNIX and LINUX** *by John Muster, 2003, TMH.*
5. **Advanced Unix programmer’s Guide** *by Stephen Prato, BPB*
6. **Unix- Concept and applications** *by Sumitabha Das, 2002, T.M..H*

**MA401: NUMERICAL METHODS & COMPUTER PROGRAMMING**

**Credits: 04**

**L-T-P: 3-1-0**

**Unit I**

*Computer Arithmetic*

Floating point Arithmetic, Normalization, Approximations and errors, types of error in computations

**Unit II**

*Transcendental and Polynomial Equations*

Methods of iteration for finding solution of transcendental and equations: Newton Raphson Method, Regula-Falsi Method, Bisection Method, Secant Method.

Solution of linear simultaneous equations by Gauss Elimination Method & Gauss Siedal Method.

**Unit III**

*Curve Fitting and Interpolation*

Linear and non-linear Regression Analysis. Difference table, Newton’s Forward and Backward interpolation formulae, Lagrange’s Interpolation Formula, Divided differences and Newton’s general formula.

**Unit IV**

*Numerical Differentiation & Integration*

Numerical differentiation, Numerical Integration: Trapezoidal and Simpson’s Rules. Gaussian Quadrature Formula.

**Unit V**

*Numerical Solution of Ordinary Differential Equations*

Euler method, Modified Euler Method, Taylor Series Method, Runge - Kutta Method and Predictor – Corrector Method.

**Texts / References:**

1. E. Balaguruswamy: **Numerical Methods**, Tata McGraw Hill
2. Jain, Iyengar and Jain: **Numerical Methods for Scientific and Engineering Computations**, New Age International, New Delhi
3. Sastry, S.S.: **Introductory Methods of Numerical Analysis**, PHI
4. B.S. Grewal: **Numerical Methods for Engineering and Science**, Khanna Publishers
5. Schaum’s Outlines: **Numerical Analysis**, Tata McGraw Hill