

Integral University
STUDY & EVALUATION SCHEME
B.Tech. CSE/IT

Year 2nd, Semester IV

S.No	Course Code	Subject	Periods			Evaluation Scheme				Subject Total
						SESSIONALS			Exam	
			L	T	P	CT	TA	Total	ESE	
Theory Subjects										
1.	IMA 402	Mathematical Analysis	3	1	-	30	20	50	100	150
2.	ICS 401	Computer Organization	3	1	-	30	20	50	100	150
3.	ICS 402	Object Oriented Programming & C++	3	1	-	30	20	50	100	150
4.	ICS 403	Software Engineering	3	1	-	30	20	50	100	150
5.	ICS 404	Data Base Management System	3	1	-	30	20	50	100	150
6.	IHU-401 /ICS-405	Disaster Management/ Cyber law & Information Security	2	1	-	15	10	25	75	100
7.	IHU-403	* Human Values & Professional Ethics	3	0	-	-	-	-	50	50
Practicals/Training/Project										
8.	ICS 451	Computer Organization Lab	-	-	3	10	10	20	30	50
9.	ICS 452	Object Oriented Programming Lab Using C++	-	-	3	10	10	20	30	50
10.	ICS 453	Software Engineering Lab	-	-	3	10	10	20	30	50
11.	ICS 454	DBMS Lab	-	-	3	10	10	20	30	50
12.	GP-401	General Proficiency	-	-	-	-	-	50		50
Total			20	6	12	-	-	405	695	1100

- This subject is offered as compulsory audit course for which passing marks is 50% in ESE and the marks will not be added. It has to be cleared till final year.

MATHEMATICAL ANALYSIS
IMA-402

L T P
3 1 0

Unit-I

Errors: Error and their analysis, Computer Arithmetic, Floating-Point Number Operation, Normalization & their consequences.

Statistics: Correlation and Regression analysis, Binomial Distribution, Poisson Distribution, Normal Distribution. [8]

Unit-II

Algebraic & Transcendental Equations:

Bisection Method, Iteration Method, False Position Method, Secant method, Newton-Raphson Method, Lin-Bairstow's Method. Rate of Convergence of Methods. Solution of system of linear equations by LU decomposition method and Gauss Seidel Method.

[8]

Unit-III

Interpolation: Finite differences, Newton's forward & backward Formula, Gauss, Stirling and Bessel's Formula for Equal Interval. Lagrange's Formula and Newton's Divided Difference Formula for Unequal Interval, Numerical Differentiation. [8]

Unit-IV

Numerical Integration & Solution of Ordinary Differential Equations:

Numerical Integration by Trapezoidal Rule, Simpson's 1/3 Rule, Simpson's 3/8 Rule, Boole's & Weddle's Rule, Euler-Maclaurin's Formula.

Taylor's Series Method, Euler's Method, Modified Euler's Method, Runge-Kutta Method. [8]

Unit-V

Integral Transform & Complex Analysis:

Introduction to Fourier Transform, Sine and Cosine transforms, Z-transform.

Analytic functions, C-R equations and harmonic functions, Cauchy's integral theorem, Cauchy's integral formula for derivatives of analytic functions, Conformal mapping and bilinear transformations. [10]

References:

1. Sastry, Introductory method of Numerical Analysis, PHI
2. Balaguruswamy, Numerical method, TMH
3. Jain, Iyengar, Jain, Numerical Methods for Scientific & Engineering Computations, New Age International
4. P. Kandasamy, Numerical methods, S. Chand & Company
5. H.K. Dass, Advanced Engineering Mathematics, S. Chand & Company
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Pub.

COMPUTER ORGANIZATION

ICS-401

L T P
3 1 0

Unit 1

Digital Computer: Elements of Digital Computer, Computer Types and Classifications, Functional Units and their Interconnections, Buses, Bus Architecture, Types of Buses And Bus Arbitration, Register, Bus And Memory Transfer.

Micro Operations: Register Transfer, Bus & Memory Transfer, Bus Architecture, Arithmetic, Logic & Shift Micro Operations.

Data Representation: Fixed Point & Floating Point Representation, IEEE Standard [08]

Unit 2

Central Processing Unit: CPU Organization: General Register Organization, Stack Organization, Addressing Modes, Arithmetic And Logic Unit (ALU).

Computer Arithmetic's: Addition And Subtraction of Signed Numbers, Look Ahead Carry Adders.

Multiplication: Signed Operand Multiplication, Booths Algorithm and Array Multiplier. Division and Logic Operations. [08]

Unit 3

Control Unit: Instruction Types, Formats, Instruction Cycles and Sub Cycles (Fetch and Execute etc), Micro-Operations, Execution of a Complete Instruction.

Hardware And Micro Programmed Control: Micro Program Sequencing, Wide Branch Addressing, And Microinstruction With Next Address Field, Pre-Fetching Microinstructions, Concept of Horizontal and Vertical Microprogramming. [09]

Unit 4

Memory Organization: Memory Basic Concept, Memory Hierarchy, Semiconductor RAM Memories, 2d & 2 1/2d Memory Organizations. ROM Memories.

Cache Memory: Cache Design and Performance, Cache Addressing Mapping and Replacement Policy. **Auxiliary Memories:** Magnetic Disk, Magnetic Tape and Optical Disks, **Virtual Memory:** Concept Implementation. [08]

Unit 5

I/O Organization: Peripheral Devices, Input/output Interface, **Interrupts:** Interrupt Hardware, Types of Interrupts And Exceptions.

Mode of Data Transfer: Strobe Programmed I/O, Interrupt Initiated I/O and Direct Memory Access, I/O Channels and Processors.

Serial Communication: Synchronous & Asynchronous Communication, Standard Communication Interfaces. [09]

References

1. "Computer System Arch." By- Morris Mano, Prentice Hall India, New Delhi.
2. "Computer Organization." By- Vranesic & Hamacher, Tata Mgraw Hill, New Delhi
3. "Computer Organization and Arch." By- J P Hayes. Tata Mgraw Hill, New Delhi
4. "Computer Organization and Architecture Design And Performance" By- William Stallings, Prentice Hall India, New Delhi.

OBJECT ORIENTED PROGRAMMING & C++
ICS-402

L T P
3 1 0

UNIT 1

Object Oriented Programming: Concepts, Comparison with other approaches, **Designing:** Object Modeling, Dynamic Modeling, Functional Modeling, **Modeling Concepts and Terminologies:** Links and Association, Generalization, Aggregation and Specialization, Abstract Class & Concrete Class, Meta Data, Candidate Keys, Constraints, Events and States, Operations, Data Flow Diagram, Study of Model specifying static structure, behavior at various states and its impact. [10]

UNIT 2

Program Planning: Algorithms, Flowcharts, Pseudo code; **Introduction and Overview of C++:** Evolution of C++, Advantages and Limitations; Structure of C++ program; Analysis of a program; Compilation and Execution on Windows, Unix and Linux; Stages of Compilation; **Components of a C++ Program:** characters, Identifiers, Keywords, Tokens, Literals, Statements, Expressions and Input / Output. **C++ programs based on above concept.** [8]

UNIT 3

Basics: Data Types, Variables, Constants, Operators, Expressions, Control Statements, Library Functions and Pre-processor Directives; Arrays; Pointers; String Handling; Structure & Union; Dynamic Memory Management.
Objects and Classes: Concept, Sample Program and Analysis, Types of Classes, Access Specifier, **C++ programs based on above concept.** [8]

UNIT 4

Objects and Classes continued: Constructors and Destructors; Functions: Invoking a Function, Recursive Function, Member Functions, Inline Functions, Friend functions; **Inheritance:** Types and Implementation, Virtual Base Class; **Polymorphism:** Operator Overloading, Function Overloading; **Pointers:** This pointer, Pointer to objects, Pointer to derived classes, Virtual Functions. **C++ programs based on above concept.** [8]

UNIT 5

Return objects from functions; Exception handling.
File Handling: File Streams, File Attributes, File operations: create, read/ write, open, save, update, Access Records Randomly; Templates; **Case Study:** Design and Implementation. **C++ programs based on above concept.** [8]

REFERENCES

1. Rum Baugh, etal:” Object oriented design and modeling”. PHI 1993. Budd, “Object Oriented Programming”, Addison Wesley.’
2. Robert Lafore, “Object Oriented Programming in C++”, Techmedia.
3. E. Balagurusamy, “Programming in C++”, TMH.
4. K.R. Venugopal” Mastering in C++”, TMH publication
5. Bjarne Stroustrup, “C++ Programming Language”, Addison Wesley.

SOFTWARE ENGINEERING
ICS-403

L T P
3 1 0

UNIT 1

Introduction to Software Engineering: Types of Software, Software Characteristics, Quality of a Good Software, Software Myths, Software Components, Software Crisis, **Software Engineering:** Definition, Challenges, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes.

Software Development Life Cycle Models: Build and Fix Models, Waterfall Model, Prototyping Model, RAD Model Iterative Enhancement Model, Evolutionary Development Model and Spiral Model, WINWIN Spiral Model, Fourth Generation Techniques. [9]

UNIT 2

Planning a Software: Process Planning, Effort Estimation: Uncertainties in Effort Estimation, Building Effort Estimation Models, A Bottom-Up Estimation Approach, COCOMO Model, Project Scheduling & Staffing: Overall Scheduling, Detailed Scheduling, Team Structure, Software Configuration Management(SCM): - Baselines, Version Control, Change Control & Configuration Audit, Risk Management: Reactive and Proactive Risk Strategies, Software Risks, Risk Analysis, Identification, Projection, Assessment, Monitoring and Managing the Risk, RMMM Plan. [8]

UNIT 3

Software Requirements Analysis and Specification: Software Requirements: Need for SRS, Requirement Process, Problem Analysis: Informal & formal Approaches, Data Flow Modeling, Object Oriented Modeling, Prototyping, Requirements Specifications: Characteristics of an SRS, Components of SRS, Specification Language, Structure of Requirement Document: IEEE Standards for SRS, Validation, Metrics.

Designing and Coding: Designing: Function Oriented Design: Design Principles: Problem Partitioning and Hierarchy, Abstraction, Modularity, Top Down and Bottom-Up Strategies, Module Level Concepts: Coupling, Cohesion; Structure Design Methodology, Verification, Introduction to Object Oriented Design & User Interface Design, Software Measurement Metrics: Various Size Oriented Measures- Halestead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs. [10]

UNIT 4

Coding: Programming Principles and Guidelines: Common Coding Errors, Structured Programming, Information Hiding, Programming Practices, Coding Standards, Coding Process, Refactoring, Verification: Code Inspection, Static Analysis, Proving Correctness, Combining Different Techniques, Metrics.

Testing:

Testing Fundamentals: Error Fault and Failure, Test Oracles, Test Cases and Test Criteria, Test Case Execution and Analysis, Unit Testing, Integration Testing: : Top Down and Bottom up, Acceptance Testing: Alpha and Beta Testing., Regression Testing, functional and non-functional testing. Testing Techniques: White Box: Logic Coverage, Path Coverage, Loop Coverage, Data Flow Testing. Black Box Testing: Boundary Value Analysis, Equivalence Class Testing, state Table Based Testing, Decision Table Based Testing. [9]

UNIT 5

Computer Aided Software Engineering (CASE): CASE Tools, Scope, Benefits of CASE Tool, support in Software Life Cycle, Architecture of CASE Environment, Types of CASE Tools, Software Reliability and Quality Management: -Software Quality Management: Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Reviews, and Statistical Quality Assurance. Software Reliability, ISO 9000 Quality Standards, CMM Levels. [8]

REFERENCES

1. Software Engineering: A Practitioner's Approach by Roger S. Pressman, McGraw-Hill International edition.
2. An Integrated Approach to Software Engineering, by Pankaj Jalote, Narosa Publishing House.
3. Software Engineering by K.K. Agarwal.
4. Software Engineering by Ian Sommerville, Addison-Wesley.
5. Fundamentals of Software Engineering by Rajib Mall, PHI.

DATABASE MANAGEMENT SYSTEM
ICS-404

L T P
3 1 0

UNIT 1

Introduction: An Overview of Database Management System, Database System Vs File System, Database System Concepts and Architecture, Data Models Schema and Instances, Data Independence and Data Base Language and Interfaces, Data Definitions Language, DML, Overall Database Structure.

Data Modeling Using the Entity Relationship Model:

ER Model Concepts, Notation for ER Diagram, Examples based on E-R diagram, Mapping Constraints, Keys, Concepts of Super Key, Candidate Key, Primary Key, Generalization, Aggregation, Reduction of an ER Diagrams to Tables, Extended ER Model, Relationships of Higher Degree. [8]

UNIT 2

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 to SQL: Characteristics of SQL. Advantage of SQL. SQL Data Types 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 in SQL.

Queries based on above concepts. [9]

UNIT 3

Data Base Design & Normalization:

Functional Dependencies, Normal Forms, First, Second, Third Normal Forms, BCNF, Inclusion Dependencies, Loss Less Join Decompositions, Normalization using FD, MVD, and JDs, Alternative Approaches to Database Design.

Storage and File Structure, Overview of Physical Storage Media, File Organization, Organization of Records in File, Data Dictionary Storage. [8]

UNIT 4

Indexing & Hashing: Basic Concepts, B+ Tree Index Files, B- Tree Index Files, Static Hashing, Dynamic Hashing.

Transaction Processing Concepts: Transaction System, Testing of Serializability, Serializability of Schedules, Conflict & View Serializable Schedule, Recoverability, Recovery from Transaction Failures, Log Based Recovery, Checkpoints, Deadlock Handling.

[8]

UNIT 5

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. [8]

REFERENCES

1. Korth, Silbertz, Sudarshan, "Data base concepts", McGraw-Hili
2. Elmasari, Navathe, "Fundamentals of Database Systems", Addison Wesley
3. Date C.J., "An Introduction to Database Systems", Addison Wesley

DISASTER MANAGEMENT
HU-301/HU-401

L T P
2 1 0

Objective: The objective of this course is to familiarize the students with basic management principles relating to disaster management and mitigation techniques.

Unit-I

- Concept of Disaster Management
- Types of disaster and their impact: Natural and Man made like- Earthquakes, Floods, Droughts, Cyclones, Avalanches, Forest Fires, Terrorism related disaster etc.
- Assessment of Human and Economic Losses. 6

Unit-II

- Impact of Extensive Industrialization
- Impact of Global Warming and Environmental degradation
- National and Global Disaster. 6

Unit-III

- National Policy for Disaster Management, Elementary knowledge of the disaster management Act 2005
- Types of Responses: Central, State, District level, People's community participation in Disaster management.
- Post Disaster management and Rehabilitation measures. 6

Unit-IV

- Capacity building for meeting disasters.
- Long- term measures for prevention of Disasters.
- Mitigation techniques/ Strategies: Early Warning Systems, Data sharing at National and International Levels. 6

CYBER LAW AND INFORMATION SECURITY
ICS-405

L T P
2 1 0

Unit 1

Fundamentals of Cyber Law: Jurisprudence of Cyber Law, Object and Scope of the IT Act 2000, Introduction to Indian Cyber Law, Unicitral Model Law, ISP Guideline. Intellectual property issues and cyber space, Indian perspective, Overview of Intellectual property related legislation in India, Patent, Copy Right, Trademark law, Law related to semiconductor layout & design. [7]

Unit 2

E - Commerce: Security Threats to E - Commerce, Virtual Organization, Business Transactions on Web, E-Governance and EDI, Concepts in Electronics payment systems, E-Cash, Credit/Debit Cards, E- Agreement, Legal recognition of electronic and digital records, E-Commerce Issues of privacy, Wireless Computing- Security challenges in Mobile devices. Digital Signatures - Technical issues, legal issues, Electronic Records, Digital Contracts, Requirements of Digital Signature System. [8]

Unit 3

Investigation and Ethics: Cyber Crime, Cyber jurisdiction, Cyber crime and evidence act, Treatment of different countries of cyber crime, Ethical issues in data and software privacy, Plagiarism, Pornography, Tampering computer documents, Data privacy and protection, Domain Name System, Software piracy, Issues in ethical hacking.

Internet security treats: Hacking, Cracking, Sneaking, Viruses, Trojan horse, Malicious Code & logic bombs.

Introduction to biometric security and its challenges, Finger prints.

Cyber crime forensic: CASE STUDY in Cyber Crime. [8]

Unit 4

Information security- Information Systems and its Importance, Role of Security in Internet and Web Services, Principles of Information Security, Classification of Threats and attacks, Security Challenges, Security Implication for organizations, Security services - Authentication, Confidentiality, Integrity, Availability and other terms in Information Security, Information Classification and their Roles. Introduction to Cryptography, Issues in Documents Security, Keys: Public Key, Private Key, Firewalls, Basic Concepts of Network Security, Perimeters of Network protection & Network attack, Need of Intrusion Monitoring and Detection. [9]

References:

1. Harish Chander “Cyber Law and IT Protection” , PHI Publication, New Delhi

2. Merkov, Breithaupt, “ Information Security”, Pearson Education
3. “Cyber Law in India” - Farooq Ahmad-Pioneer books.
4. K. K. Singh, Akansha Singh “Information Security and Cyber law”, Umesh Publication, Delhi

8423552865
E.E.E

8423552865

B.Tech (3rd & 4th Semester) Common to all branches

IHU-3/3/403

Human Values & Professional Ethics

owais Iqbal

Maximum Marks:50

L T P: 3 0 0

Unit-1

Human Value Education: Understanding the need, basic guidelines, content and process for value education, self exploration – Its content and process; Natural acceptance' and Experiential Validation- as the mechanism for self exploration, Continuous Happiness and Prosperity- A look at basic Human Aspirations, Right understanding, Relationship and Physical Facilities- the basic requirement for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly

6

Unit-2

Introduction to Ethical Concept: Definition of industrial ethics and values, Ethical rules of industrial worker. Values and Value Judgments. Moral Rights and Moral Rules, Moral character and responsibilities. Privacy, Confidentiality, Intellectual Property and the Law. Ethics as Law.

6

Unit-3

Professional Responsibility: The basis and scope of Professional Responsibility, Profession and Norms of Professional Conduct, Ethical Standards versus Profession, Culpable mistakes, the autonomy of professions and codes of ethics. Employee status and Professionalism. Central Professional Responsibilities of Engineers: The emerging consensus on the Responsibility for safety among engineers, hazards and risks.

6

Unit-4

Engineers Ethics: senses of Engineering Ethics'-variety of moral issues-types of enquiry - moral dilemmas - moral autonomy – Kohlberg's theory – Gilligan's theory – consensus and controversy – Models of Professional Roles – theories about right action – Self-interest – customs and religion – uses of ethical theories. Valuing Time – Co-operation – Commitment.

6

Unit-5

Global Issues: A Glimpse of Life Stories: Life story of Prophet Mohammad, Mahatma Gandhi, Swami Vivekanand, Marie Curie and Steve Jobs. Multinational corporations – Environmental ethics – computer ethics – weapons development – engineers as managers – consulting engineers – engineers as expert witnesses and advisors- moral leadership.

6

Text Books:

1. R.P Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Value Education.
2. Mike Martin and Ronald Schinzinger, "Ethics in Engineering", McGraw-Hill, New York 1996
3. Govindarajan M, Natrajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India. New Delhi, 2004

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education Website, <http://www.uptu.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore. An Inconvenient Truth, Paramount Classics, USA
4. Charlie Chaplin, Modern Times, United States, USA
5. IIT Delhi, Modern Technology- The Untold Story

COMPUTER ORGANIZATION LAB
ICS-451

L T P
0 0 3

1. Design & Implementation of various flip flop SR, JK, D and T.
2. Design & Implementation of half adder and full adder circuit.
3. Design & Implementation counters.
4. Design & Implementation Registers.
5. Design of arithmetic and logic unit.
6. Register level design of 4 bit magnitude comparator.
7. Design & Implementation of 2*2 bit unsigned multiplier.
8. Design & Implementation of associative memory cell.
9. Design & Implementation of MUX & DEMUX.
10. Design & Implementation of ADC & DAC circuit

Note: Some more experiments can be added

OBJECT ORIENTED PROGRAMMING LAB USING C++
ICS-452

L T P
0 0 3

1. Programs Using Functions
 - Functions with default arguments
 - Implementation of Call by Value, Call by Address and Call by Reference

2. Simple Classes for understanding objects, member functions and Constructors
 - Classes with primitive data members
 - Classes with arrays as data members
 - Classes with pointers as data members – String Class
 - Classes with constant data members
 - Classes with static member functions

3. Compile time Polymorphism
 - Operator Overloading including Unary and Binary Operators.
 - Function Overloading

4. Runtime Polymorphism
 - Inheritance
 - Virtual functions
 - Virtual Base Classes
 - Templates

5. File Handling
 - Sequential access
 - Random access

**SOFTWARE ENGINEERING LAB
ICS-453**

**L T P
0 0 3**

A) SECTION – A

1. Illustration of various activities using MS-Project 2000.
2. Perform Cost/Benefit Analysis using tools.
3. Design & Development of Test Cases.
4. Development of Software Tool for Halstead Analysis.
5. Program for Computing Cyclomatic Complexity.

B) SECTION – B

CASE TOOLS LAB

a) Program Analysis and Project Planning.

Through study of the problem-identify project scope, Objectives, Infrastructure.

b) Software Requirement Analysis

Describe the individual phases/modules of the project, Identify deliverables.

c) Data Modeling

Use work products-Data dictionary, Use diagrams and activity diagrams, build and test lass diagrams, Sequence diagrams and add interface to class diagrams.

d) Software Development and Debugging.

e) Software Testing

Prepare test plan, perform validation testing, Coverage analysis, memory eaks, develop test case hierarchy, Site check & Site monitor.

- Note :**
1. All the programs of *Section – A* are to be written using C/C++ / Java.
 2. All the exercises of *Section – B* are to be solved using latest CASE tools like VISIO/RATIONAL ROSE or any other.

DATABASE MANAGEMENT SYSTEMS LAB
ICS-454

L T P
0 0 3

1. Database design using E-R Model and Normalization.
2. Write the queries for DDL, DML & DCL.
3. Write Queries using Logical Operators (=, <, > etc.)
4. Write queries using SQL operators (BETWEEN...AND, IN(list), LIKE, ISNULL and along with Negation expressions.)
5. Write SQL query using Character, Number, Date and Group Functions.
6. Write SQL Queries for Relational Algebra (UNION, INTERSECT and MINUS etc.)
7. Write queries for extracting data from more than one table (Equi-Join, Non-Equi Join, Outer Join)
8. Write SQL Queries for Sub queries, Nested queries.
9. Concept of COMMIT, ROLLBACK and CHECK POINTS.
10. Creation of Views.
11. Write programs by the use of PL/SQL (Procedures and Functions.)
12. High-level language extension with Cursor and with Triggers.
13. Creation of Forms & Reports.
14. Design and Implementation of the Mini Project.