

<b>Type</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>
<b>PCC</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>

**Prerequisite:**

**Course Content:**

**Unit-1:**

Introduction: Operating System and its functions, Evolution of Operating System, Batch, Interactive, Time Sharing and Real Time Operating System, System Protection. Operating System Structure: System Components, System Structure, Operating System Services.

**Unit-2:**

Process Management: Process Concept, Process State, Process Control Block, Threads. Concurrent Processes: Principle of Concurrency, Mutual Exclusion, Inter Processes Communication, Critical Section Problem, Semaphores, Classical Problems in Concurrency, Producer / Consumer Problem, Readers-Writers Problem, Dining Philosophers Problem.

**Unit-3:**

CPU Scheduling: Scheduling Concept, Scheduling Techniques, Performance Criteria for Scheduling Algorithm, Evolution, Multiprocessor Scheduling. Deadlock: System Model, Deadlock Characterization, Prevention, Avoidance and Detection, Recovery From Deadlock Combined Approach.

**Unit-4:**

Memory Management: Basic Machine, Resident Monitor, Multiprogramming with Fixed Partition, Multiprogramming With Variable Partition, Multiple Base Register, Paging, Segmentation, Paged Segmentation. Virtual Memory: Virtual Memory Concept, Demand Paging, Performance, Paged Replaced Algorithm, Allocation of Frames, Thrashing, Cache Memory Organization, Impact on Performance.

**Unit-5:**

I/O Management & Disk Scheduling: I/O Devices, Organization of I/O Function, Operating System Design Issues, I/O Buffering, Disk Scheduling (FCFS, SCAN, CSCAN). File Management: File Concept, File Organization, File Directories, File Sharing, Allocation Methods, Free Space Management, and Implementation Issues.

**Text and References Books:**

1. Milenkovik, "Operating System Concept", McGraw Hill.
2. Petersons, "Operating Systems", Addison Wesley.
3. Dietal, "An Introduction to Operating System", Addison Wesley.
4. Tannenbaum, "Operating System Design and Implementation", PHI.
5. Gary Nutt, "Operating System, A Modern Perspective", Addison Wesley.
6. Stalling, Williams, "Operating System", Maxwell Macmillan
7. Silveschatz, Peterson J., "Operating System Concepts", Willey.
8. Crowley, "Operating System", TMH.

**Course Outcomes:**

1. Understand types and structure of operating systems. (Understand)
2. Develop programs using system-calls related to process, memory and file management. (Apply)
3. Construct solutions for problems related to process scheduling, deadlocks and synchronization in a multi-programmed operating system. (Apply)

Type	L	T	P	Credits
ESC	2	1	2	4

**Prerequisite:****Course Content:****Unit-1:**

History of the web, Protocols governing the web, Growth of the Web, Web 2.0 and its features. Introduction to Cyber Laws in India, Introduction to International Cyber laws, Web project, Web Team, Team dynamics, Communication Issues, the Client, Multi departmental & large scale Websites, Quality Assurance and testing, Technological advances and Impact on Web Teams.

59/6

**Unit-2:**

HTML: Formatting Tags, Links, List, Tables, Frames, forms, Comments in HTML, DHTML, and Introduction to HTML 5, JavaScript: Introduction, Documents, Documents, forms, Statements, functions, objects in JavaScript, Events and Event Handling, Arrays, FORMS, Buttons, Checkboxes, Text fields and Text areas, Introduction to j-Query.

**Unit-3:**

XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX parsers, Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK, Introspection, Using Bound properties, Bean Info Interface, Constrained properties, Persistence, Customizes, Java Beans API, Introduction to EJBs.

**Unit-4:**

Web Servers and Servlets: Tomcat web server, Introduction to Servlets: Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servelet Package, Reading Servlet parameters, Reading Initialization parameters, The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues. Introduction to JSP: The Anatomy of a JSP Page. JSP Application Design with MVC, JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing Sharing Session and Application Data Memory Usage Considerations

**Unit-5:**

Database Access: Database Programming using JDBC, Studying Javax.sql.\* package, Accessing a Database from a JSP Page, Application – Specific Database Actions, Deploying JAVA Beans in a JSP Page, Introduction to struts framework. Semantic Web: Introduction, growth and evolution, goals and vision, need, problems, Architecture, applications.

**Lab Work:**

1. Design a HTML page to display your CV.
2. Design a HTML form to reserve a railway ticket.
3. Write a Java Script program that finds the greatest common divisor of two numbers.
4. In the form mentioned in problem 2 to reserve a railway ticket add the following validations using java Script.
  - From city and to city are two different cities.
  - Age of passengers should not be greater than 150.
  - Name of the passenger should be a string of a maximum length
5. Write a program for illustrating client/server side scripting with help of ASP.
6. Write a piece of code in XML for creating DTD, which specifies set of rules.
7. Create style sheet in CSS/XSL and display the document in Internet Explorer.

**Text and References Books:**

1. Burdman, "Collaborative Web Development", Addison Wesley.
2. Ivan Bayross, "Web Technologies Part II", BPB Publications.
3. Deitel & Deitel, "Internet and World Wide Web – How to Program", Goldberg, Pearson Education.
4. Eric Ladd, Jim O' Donnell, Using XML and JAVA", Prentice Hall of India
5. Hans Bergsten, Java Server Pages, S. Reilly
6. Patrick Naughton and Herbert Schildt, The complete Reference Java 2 Fifth Edition by TMH

#### Prerequisite:

#### Course Content:

##### Unit-1: Fundamentals of Logic

**Propositional Logic:** Propositions, Basic logic operations and truth tables, Tautologies, Contradictions, Contingency, Algebra of propositions, Logical equivalence: the laws of logic, Logical implication: Rules of inference, Logical analysis of argument, Some computing application (Normal forms), Functionally complete set of operations, Formal proofs.

**First Order Predicate Logic:** Predicates & quantifiers, Nested quantifiers, Use of quantifiers, Rules of inference, Validity of arguments and proof methods.

##### Unit-2: Set Theory, Relations and Functions

**Set Theory:** Sets & subsets, Venn diagrams, set operations and laws, countable set, Cartesian product, Cardinality, Principle of inclusion- exclusion.

53/

**Relations:** Relation, Representation & properties, n-ary relations and applications, Composition of relations, Closures of relations, Equivalence relation & partitions, partial orders, compatibility relation.

**Functions:** Functions and its types, Inverse function, Composition of functions, Special functions, Recursively defined functions, Computational Complexity, Analysis of algorithms.

**Theorem Proving Techniques:** Mathematical induction (weak, strong, structural) and its applications, Proof by contradiction, Pigeonhole principle.

##### Unit-3: Algebraic Structures and Coding Theory

**Algebraic Structures:** Definition, Properties, Semi group, Monoid, Group, properties of groups, Subgroup, Cyclic group, Cosets and Lagrange's theorem, Permutation groups, Normal subgroup, Homomorphism and isomorphism of groups, Congruence relation, Rings and Fields. Example and standard results.

**Coding Theory:** Elements of coding theory, Hamming matrix, Parity-check and generator matrices, Coding and error detection, Group codes: decoding with coset leaders and error correction, Hamming matrices.

##### Unit-4: Partially Ordered Structures

**Posets:** Definitions, ordered set, Hasse diagram, isomorphic ordered set, well ordered set, Minimal and Maximal elements, LUB & GLB etc.

**Lattices:** Definition & Properties, Product Lattices, Isomorphic Lattices, Applications, Types of Lattices.

**Boolean Algebra:** Definitions & Properties, SOP & POS forms, Logic gates and minimization of circuits, Karnaugh maps, Quine-McClusky method.

**Trees:** Definition & Examples and Properties, Rooted tree, Binary tree, Tree traversal, application in computer science and engineering.

##### Unit-5: Combinatorics and Graph Theory

**Combinatorics:** Discrete numeric functions and properties, Recurrence relations and their applications (modeling), various methods of solutions, system of recurrence relations, OGF & EGF, properties, applications: solution of recurrence relations and combinatorial problems.

**Graphs:** Graphs and graph models, terminology, matrices associated with graphs, Isomorphism, Special types of graphs, connectedness, Euler and Hamilton graphs with their applications, trees with properties, MST, planar graphs and applications, criteria of planarity, Graph coloring and coloring models, directed graphs.

#### Text and Reference Books:

1. Trembley, J.P. & R. Manohar, "Discrete Mathematical Structures with applications to Computer Science", McGraw Hill
2. Kenneth H. Rosen, "Discrete Mathematics and its Applications", McGraw Hill.
3. Ralph, P. Garibaldi, "Discrete & Combinatorial Mathematics" Pearson Publication, Asia.
4. Deo, narsingh, "Graph Theory with applications to Engineering & Computer

Type	L	T	P	Credits
PCC	3	1	2	5

**Prerequisite:****Course Content:****Unit-1:**

Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models, Selection of Software Development Models,

**Unit-2:**

Software Requirement Specifications (SRS) Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS, Estimation of various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management.

55/61

**Unit-3:**

Software Design Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Halstead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs.

**Unit-4:**

Software Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top-Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of Products. Static Testing Strategies: Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards.

**Unit-5:**

Software Maintenance: Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering, Software Configuration Management Activities, Change Control Process, Software Version Control, Defect Detection and Removal: Defect Amplification Model, An Overview of CASE Tools.

**Lab Work:**

Lab exercises or a Mini Project (as per list given below) to be carried out using languages like C++, Java, C# and tools like Visio, ARGOUML, Rational Rose etc. Design and Implementation of an Object based application using any one of the above languages/tools is desirable.

- Hotel Automation System
- Book Shop Automation Software
- Word processing Software
- Software Component Cataloguing
- Payroll System
- Banking System
- Purchase Order System
- Library Management System





## PRINCIPLES OF PROGRAMMING LANGUAGES (ECS-254)

Type	L	T	P	Credits
PCC	2	1	0	3

### Prerequisite:

### Course Content:

#### Unit-1:

**Introduction:** Characteristics of programming Languages, Factors influencing the evolution of programming language, developments in programming methodologies, desirable features and design issues. Programming language processors: Structure and operations of translators, software simulated computer, syntax, semantics, structure, virtual computers, binding and binding time.

#### Unit -2:

Elementary and Structured Data Types: Data object variables, constants, data types, elementary data types, declaration, assignment and initialization, enumeration, characters, strings. Structured data type and objects: Specification of data structured types, vectors and arrays, records, variable size data structure, pointers and programmer constructed data structure, Sets files. Sub Program and programmer defined data types: Evolution of data types, abstractions, encapsulations, information hiding, sub programs, abstract data types.

#### Unit -3:

Sequence Control; Implicit and Explicit sequence control, sequence control with within expression and statements, recursive sub programs, exception handling, co routines, Scheduled sub programs, concurrent execution. Data control referencing environments, static and dynamic scope, local data local data referencing environment, shared data: Explicit common environment dynamic scope parameter passing mechanism.

#### Unit-4:

Storage Management: Major run time requirements, storage management phases, static storage management, stack based, heap based storage management. Syntax and translation: General syntactic criteria, syntactic element of a language, stages in translation, formal syntax and semantics.

#### Unit-5:

Operating and Programming Environment: Batch Processing Environments, Embedded system requirements, Theoretical models, Introduction to Functional Programming, Lambda calculus, Data flow language and Object Oriented language, Comparison in various general and special purpose programming languages e.g. Fortran, C, Pascal, Lisp, etc.

### Text and References Books:

1. Terrance W. Pratt, "Programming Languages: Design and Implementation" PHI
2. Sebesta, "Concept of Programming Language", Addison Wesley
3. E Horowitz, "Programming Languages", 2nd Edition, Addison Wesley

### Course Outcomes:

1. Understand the evolution of programming languages alongwith the desirable features and design issues. (Understand)
2. Understand the requirement of elementary and structured data types in programming languages and analyze their features. (Analyze)

## ORGANISATIONAL BEHAVIOUR (HHS-254)

Type	L	T	P	Credits
HSMC	3	0	0	3

### Prerequisite:

### Course Content:

#### Unit 1: Introduction to organizations

What is an organization, components of organization, nature and variety of organizations (in terms of objectives, structure etc.), models of analyzing organizational phenomena, organizational and business variables, organizations in the Indian context, institutions and structures.

#### Unit 2: Dimensions of Individual Behavior

Individual Behavior, Dimensions of individual behavior: Perceptions, Learning, Motivation, Personality, Commitment, Attitudes, Values & Ethics, Stress Management

#### Unit 3: Dimensions of Interpersonal Behavior

Transactional Analysis, Interpersonal communication, Listening, Feedback, Counseling,

#### Unit 4: Group Behavior

Leadership, Communication, Group: Formal Vs Informal Groups, Group Decision making, Team: Team building, team problem solving.

#### Unit 5: Organizational Dimensions

Organizational Structure: Elements of Organizational Structure, Dimensions of Organizational Structure, Organizational change, Organizational Development, Power, Authority, Politics

*Note:- Integrating cases: Case method and lectures should be supplemented with a variety of other methodologies such as feedback on questionnaires and tests, role plays, and behavior simulation exercise.*

### Text and Reference Books:

1. Luthans Fred., "Organizational Behavior", McGraw Hill, 1998
2. Pareek, Udai, "Understanding Organizational Behavior, Oxford university press.
3. Robbins (4th ed.), "Essentials of organizational behavior", Prentice Hall of India Pvt. Ltd., New Delhi, 1995.
4. Keith Davis, "Organisational Behaviour.
5. Hersey and Blanchard (6th ed.). "Management of organizational behavior L utilising human resources", Prentice Hall of India Pvt. Ltd., New Delhi, 1996.
6. Nancy J. Adler, "International Organisational Behaviour", Cengage Learning.
7. Nelson Quick, 'Organizational Behaviour Function Learning', Fifth Edition

### Course Outcomes:

1. Apply organizational objectives, components and models in Indian context for better results for attaining organizational goals. (Apply)
2. Demonstrate individual behavioural dimensions, learning theories, perceptual process, values & ethics with motivational techniques in stressed situations. (Apply)

## CYBER SECURITY (258)

Type	L	T	P	Credits
MC	2	0	0	0

### Prerequisite:

### Course Content:

#### Unit-1:

Introduction to information systems, Types of information systems, Development of Information systems, Introduction to information security, Need for Information security, Threats of Information Systems, Information Assurance, Cyber Security and Security Risk Analysis.

#### Unit-2

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.

#### Unit-3

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.

#### Unit-4

Security Policies, why Policies should be developed, WWW Policies, Email Security Policies, Policy Review Process- Corporate policies- Sample Security Policies, Publishing and Notification requirement of the Policies. 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 Pattern Law.