



# Management Institute of Technology (MIT) Hyderabad

Affiliated with University of Sindh Jamshoro

<b>Course Title:</b>	<b>System Integration &amp; Architecture</b>
<b>Course Code:</b>	<b>ITEC-610</b>
<b>Degree Program:</b>	<b>BS(Information Technology) P-IV (1st semester)</b>
<b>Course rating:</b>	<b>3 credit hours (Theory)</b>
<b>Pre-requisites:</b>	

## Course Objectives:

A Web service is an application component deployed on a Web accessible platform, provided by a service provider to be discovered and invoked over the Web by a service requestor. Service-oriented architectures, the underlying architectural style of Web services, combine ideas from component-based and distributed systems, adding the idea of services as loosely coupled components that may be discovered and linked at runtime. Applications range from enterprise application integration, via electronic commerce, to dynamic e-business scenarios.

## Course Outline:

The lecture shall give an introduction to the basic technologies that underlay Web services and present a systematic, model-based development approach using the UML. This includes the specification of service interfaces by means of UML diagrams, the systematic (and partly automatic) generation of the corresponding XML-based descriptions, and the implementation of services in Java.

## Learning Material/References:

1. **Web Services**
2. **F. Curbera, F. Leymann, T. Storey, D. Ferguson, S.**
3. **Weerawarana, Web Services Platform Architecture: Soap,**
4. **WSDL, WS-Policy, WS-Addressing, WS-Bpel, WS-Reliable**
5. **Messaging and More; Prentice Hall, 2005.**
6. **UML**
7. **T. Pender: UML Bible; Wiley Publishing Inc, 2003.**
8. **M. Fowler, K. Scott, UML Distilled: A Brief Guide to the Standard**
9. **Object Modeling Language; Object Technology S., 2003.**



# Management Institute of Technology (MIT) Hyderabad

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<b>Course Title:</b>	<b>Distributed Computing</b>
<b>Course Code:</b>	<b>ITEC-612-613</b>
<b>Degree Program:</b>	<b>BS(Information Technology) P-IV (1st semester)</b>
<b>Course rating:</b>	<b>3 credit hours (Theory)</b>
<b>Pre-requisites:</b>	<b>Introduction to Software Development</b>

## Course Objectives:

This course is intended to provide a sound background for net centric software development. The course will concentrate an overview of major technologies like CORBA, RMI, .NET and will highlight the interfacing of middle layer with the upper layers and system layer.

## Course Outline:

Introduction to distributed systems, Distributed data, Distributed processing system, Multithreading, Thread synchronization, Resource brokerage, Resource monitoring, Load balancing, Storage elements, Batch processing models, Middle layer architecture, Resource clustering, RMI, CORBA, Net, MPI.

## Text Books/Reference Books:

- 1. Distributed Systems: Principles and Paradigms by Tanen Baum. 2nd Edition**
- 2. Distributed Systems: Concepts and Design (International Computer Science Series) by Jean Dollimore, Tim Kindberg, and George Coulouris (Hardcover - 14 Jun 2005)**



# Management Institute of Technology (MIT) Hyderabad

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<b>Course Title:</b>	<b>Human Computer Interaction</b>
<b>Course Code:</b>	<b>ITEC-618</b>
<b>Degree Program:</b>	<b>BS(Information Technology) P-IV (1st semester)</b>
<b>Course rating:</b>	<b>2 credit hours (Theory)</b>
<b>Pre-requisites:</b>	<b>Introduction to Software Development</b>

## Course Objectives:

This course provides the concepts of HCI and user interfaces, focusing on user interface design, evaluation, and technologies. The students will gain principles and skills for designing and evaluating interactive systems.

## Syllabus Outline:

Human Computer Interaction: Background, Concepts

The Psychology of Usable Things: The Psychopathology of Everyday Things, The Psychology of Everyday Things, The Psychopathology of Computers, Interface Hall of Shame, User Centered Design.

Usability Engineering: Defining Usability, Usability Evaluation, The Usability Engineering Lifecycle, Planning Usability Activities.

Know the User: Classifying Users, Research the Frames of Reference, Research the End User.

Usability Benchmarking: Competitive Analysis, Set Usability Targets, Return on Investment

Goal-Oriented Interaction Design: Creating Personas, Defining Goals for each Persona, Defining Scenarios for each Persona, Moving to a Design Solution.

Prototyping: Verbal Prototype, Low-Fidelity Paper Prototypes: High-Fidelity Paper Prototypes, Interactive Sketches, Working Prototypes, Implementation.

Usability Inspection Methods: Heuristic Evaluation, Severity Ratings, Guideline Checking, Cognitive Walkthrough, Guideline Scoring

Usability Testing Methods: Preparing for Usability Testing, Six Stages of Conducting a Test, Thinking Aloud, Co-Discovery, Formal Experiments, Query Techniques, Observational Studies (Usage Studies)

Usability in Practice: Comparison of Evaluation Techniques, Discount Usability Engineering, Differences in Evaluation Practices, Usability Reports, Usability Consulting

Visual Design and Typography: Typography, Factors Influencing the Legibility of Text.

Icon Design: Visual Association, Standard Parts of an Icon, Icon Design Principles, Cultural and International Issues, Do Not Always Use Icons, Iconic Language, The Icon Design Lifecycle, Designing Icons for Sun's Public Web Site

## Learning Material/References:

\* **HCI Models, Theories, and Frameworks: Toward a Multidisciplinary Science** by John Carroll.

\* **Usability Engineering: Scenario-Based Development of Human Computer Interaction** by Mary Rosson, John Carroll, Mary Beth Rosson.



# Management Institute of Technology (MIT) Hyderabad

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<b>Course Title:</b>	<b>Network Management &amp; Security</b>
<b>Course Code:</b>	<b>ITEC-626</b>
<b>Degree Program:</b>	<b>BS(Information Technology) P-IV (1st semester)</b>
<b>Course rating:</b>	<b>3 credit hours (Theory)</b>
<b>Pre-requisites:</b>	<b>Computer Communication and Networks</b>

## Course Objectives:

This course is designed to provide fundamental skills needed to analyze the internal and external security threats against a network, and to develop security policies that will protect an organization's information.

## Syllabus Outline:

Information Security in Today's Networked Enterprise: Security breaches, Types of threats to information security, Case studies of intrusions, Emerging trends in patterns of intrusions, Why "Security through obscurity" fails

Key Concepts in Information Security: Fundamental concepts, Safety, security, and integrity from a software engineering standpoint, Vulnerabilities, threats, and counter measures, Operating systems, networks, files, permissions, Overall security policies: the forgotten cornerstone of computer security.

Hacking: Hacking tools, Breaking in to your own system, controlled hacking

Latest Developments and Initiatives in IT Security: New generation products, Routers, Proxies, and Firewalls, auto-configuration, Dynamic Directories, Latest methodologies

Effective Security Policy for Organizations: Operational security & configuration management, Protecting your PBX and telephone systems, avoiding financial disaster, The role of audit in developing and implementing your information security framework, Responding to computer security incidents - a coordinated approach

Main Vulnerabilities of Operating Systems: Password control , "Set user-id root" programs, FTP & TFTP, "r" commands, Electronic mail, ActiveX, Java, NFS, Trusted hosts, Inappropriate file permissions, "Race conditions",

How Networks Are Being Subverted: Packet sniffers, IP spoofing, Denial of service, Dial-up connections, CGI & WWW vulnerabilities,

System Administration: The KISS principle of security, Physical assurance, Backups

Firewalls and Information Security: Basic firewall concepts, Different architectural models for firewalls, available firewall products

Ensuring Security for Electronic Commerce, Financial Networks, Intranets and Extranets: Determining a policy, Securing on-line transactions, Security in EFT/POS and ransaction services, Challenge-response systems & "smart cards" - are they really what they claim to be

Combating Viruses: Practising "safe computing", Virus delivery systems, Disk viruses, Network viruses, Document or mail viruses, Virus elimination



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Business Continuity and Disaster Recovery Planning: Establishing the cost of downtime, Developing a policy for continuity and recovery, Developing a disaster recovery plan, Maintaining operational continuity, Testing

### Reference Material:

- \* **Network Management, Principles and Practice by Mani Subramanian**
- \* **Cryptography and Network Security: Principles and Practice, 3/E, William Stallings, Prentice Hall**

**Course Title:** Computer Vision & Image Processing  
**Course Code:** ITEC-624  
**Degree Program:** BS(Information Technology) P-IV (1st semester)  
**Course rating:** 2 credit hours (Theory)  
**Pre-requisites:** Programming Fundamentals and Linear Algebra

### Course Objectives:

This course introduces fundamental concepts and techniques for image processing and computer vision.

### Syllabus Outline:

Introduction: Image, Graphics, Vision and Computer; Signal processing overview, Image processing basics, Digital image formats, Image processing and Vision systems, Applications.

Data structures for image processing: Matrices, chains, Topological data structures, Relational structures, Hierarchical data structures.

Preprocessing and Image amelioration: Histogram, histogram transformations, Modification of the histogram pattern, Filtering.

Introduction to Mathematical Morphology: Elements of Set Theory and Logic, Thinning, erosion, dilation, opening, closing.

Segmentation: Detection of connected components, Thresholding, Edge detection, Region detection

Features extraction and Representation: Region Identification, Description and Representation of contours, Description and Representation of regions.

Linear image transformations: Basic Theory, Hadamard Transform, Haar Transform, Fourier Transform, Discrete Cosine Transform, Wavelets.

Image Data compression: Presentation of different techniques and different norms of compression, Coding, Fractal Image Compression.

Elements of pattern recognition: Different methods of pattern recognition, Classification, Machine Learning Techniques Structural pattern recognition.

Texture Analysis: Statistical texture description, Syntactic texture description methods, applications.

Motion Analysis: Optical flow, Moving object detection and Tracking, Kalman filtering, Hidden Markov Models.

3D Vision: Geometry for 3D vision, Radiometry and 3D vision.

### Learning Material/References:



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- \* [Digital Image Processing, 2nd Edition, by Rafael C. Gonzalez, Richard E. Woods](#)
- \* [Computer Vision -- A Modern Approach by Forsyth and Ponce](#)
- \* [Introductory Techniques for 3-D Computer Vision by Trucco and Verri](#)