ADD-ON COURSE STRUCTURE FOR III AND IV YEARS EFFECTIVE AFTER OCTOBER 2015
B.TECH. INFORMATION TECHNOLOGY /COMPUTER SCIENCE AND TECHNOLOGY

Note:
1) Qualification pack for ASSOCIATE ANALYTICS includes the following three subjects
   1. Introduction to Analytics
   2. Big Data Analytics
   3. Predictive Analytics

2) Qualification pack for SECURITY ANALYST includes the following three subjects
   1. Information Security Management
   2. Information Security Assessments & Audits
   3. Information Security Incident Response & Management

*For registering for Big Data Analytics the prerequisite is Introduction to Analytics
*For registering for Information Security Assessments & Audits the prerequisite is Information Security Management

IV YEAR I SEMESTER

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Objectives:
- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks
- Describe public-key cryptosystem.
- Describe the enhancements made to IPv4 by IPSec
- Understand Intrusions and intrusion detection
- Discuss the fundamental ideas of public-key cryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- Discuss Web security and Firewalls

UNIT – I

Cryptography: Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT – II
Symmetric key Ciphers: Block Cipher principles & Algorithms (DES, AES, Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers, RC4, Location and placement of encryption function, Key distribution
Asymmetric key Ciphers: Principles of public key cryptosystems, Algorithms (RSA, Diffie-Hellman, ECC), Key Distribution

UNIT – III
Authentication Applications: Kerberos, X.509
Authentication Service, Public - Key Infrastructure, Biometric Authentication

UNIT - IV


UNIT - V


TEXT BOOKS:

REFERENCE BOOKS:
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.

Outcomes:
- Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
- Ability to identify information system requirements for both of them such as client and server.
- Ability to understand the current legal issues towards information security.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. IT/CST-I Sem

(A70530) DESIGN PATTERNS

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Objectives:
- Understand the design patterns that are common in software applications.
- Understand how these patterns are related to Object Oriented design.

UNIT-I
Introduction : What is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNIT-II

Creational Patterns : Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT-III
Structural Pattern Part-I : Adapter, Bridge, Composite.
Structural Pattern Part-II : Decorator, acaede, Flyweight, Proxy.

UNIT-IV
Behavioral Patterns Part-I : Chain of Responsibility, Command, Interpreter, Iterator.
Behavioral Patterns Part-II : Mediator, Memento, Observer.

UNIT-V
Behavioral Patterns Part-II (cont’d): State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.
What to Expect from Design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought.

TEXT BOOK:
1. Design Patterns By Erich Gamma, Pearson Education.

REFERENCE BOOKS:
4. Head First Design Patterns By Eric Freeman-Oreilly-spd.
5. Peeling Design Patterns, Prof. Meda Srinivasa Rao, Narsimha Karumanchi, CareerMonk Publications.
6. Design Patterns Explained By Alan Shalloway, Pearson Education.

Outcomes:
- Ability to understand and apply common design patterns to incremental / iterative development.
- Ability to identify appropriate patterns for design of given problem.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
IV Year B.Tech. IT/CST-I Sem

(A70535) MOBILE APPLICATION DEVELOPMENT

Mobile application development is the process by which application software is developed for low-power handheld devices, such as personal digital assistants, enterprise digital assistants or mobile phones. These applications can be pre-installed on phones during manufacture, downloaded by customers from various mobile software distribution platforms, or delivered as web applications using server-side or client-side processing (e.g. JavaScript) to provide an “application-like” experience within a Web browser. Application software developers also have to consider a lengthy array of screen sizes, hardware specifications and configurations because of intense competition in mobile software and changes within each of the platforms.

Objectives:
On completion of this course the students should be able to:
1. Design, implement and evaluate a User Interface for a mobile application using J2ME.
2. Create a small but realistic working mobile application for small computing devices.
3. Categorise the challenges posed by developing mobile applications and be able to propose and evaluate and select appropriate solutions.

UNIT-I


UNIT-II


J2ME Best Practices and Patterns: The Reality of Working in a J2ME World, Best Practices

UNIT-III

Commands, Items, and Event Processing: J2ME User Interfaces, Display
Class, The Palm OS Emulator, Command Class, Item Class, Exception Handling

High-Level Display: Screens, Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class

Low-Level Display: Canvas, The Canvas, User Interactions, Graphics, Clipping Regions, Animation

UNIT- IV

Record Management System: Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener

JDBC Objects: The Concept of JDBC, JDBC Driver Types, JDBC Packages, Overview of the JDBC Process, Database Connection, statement Objects, Result set, Transaction Processing, Metadata, Data Types, Exceptions.

JDBC and Embedded SQL: Model Programs, Tables, Indexing, Inserting Data into Tables, Selecting Data from a Table, Metadata, Updating Tables, Deleting Data form a Table, Joining Tables, Calculating Data, Grouping and Ordering Data, Subqueries, VIEWS.

UNIT- V


TEXT BOOKS:

REFERENCE BOOKS:

Outcomes:
- Ability to evaluate and select appropriate solutions to the mobile computing platform.
- Ability to develop the user interface.
- Ability to design a simple mobile phone game.

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IV Year B.Tech. IT/CST-I Sem

(A70533) INFORMATION RETRIEVAL SYSTEMS

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Objectives:
- To learn the different models for information storage and retrieval.
- To learn about the various retrieval utilities.
- To understand indexing and querying in information retrieval systems.
- To expose the students to the notions of structured and semi structured data.
- To learn about web search.

UNIT-I


UNIT-II

Retrieval Utilities: Relevance feedback, Clustering, N-grams, Regression analysis, Thesauri.

UNIT-III

Retrieval Utilities: Semantic networks, Parsing.

Cross-Language Information Retrieval: Introduction, Crossing the language barrier.

UNIT-IV

Efficiency: Inverted index, Query processing, Signature files, Duplicate document detection.

UNIT-V

Integrating Structured Data and Text: A Historical progression, Information retrieval as a relational application, Semi-structured search using a relational schema.

Distributed Information Retrieval: A Theoretical model of distributed retrieval, Web search.

TEXT BOOK:
REFERENCE BOOKS:
2. Soumen Chakrabarti, Mining the Web : Discovering Knowledge from Hypertext Data, Morgan-Kaufmann Publishers, 2002

Outcomes:
- Possess the ability to store and retrieve textual documents using appropriate models
- Possess the ability to use the various retrieval utilities for improving search
- Possess an understanding of indexing and compressing documents to improve space and time efficiency
- Possess the skill to formulate SQL like queries for unstructured data
- Understand issues in web search

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
IV Year B.Tech. IT/CST-I Sem

(A70541) WIRELESS NETWORKS AND MOBILE COMPUTING
(ELECTIVE - I)

Objectives:
- To understand GSM and UMTS architectures
- To have an in-depth knowledge of mobile computing
- To understand Mobile network layer and transport layer
- To understand Bluetooth technology

UNIT – I
Introduction to Network Technologies and Cellular Communications
HIPERLAN: Protocol Architecture, Physical Layer, Channel Access Control
Sub-layer, MAC Sub-layer, Information Bases and Networking
WLAN: Infrared vs. Radio Transmission, Infrastructure and Ad Hoc Networks,
IEEE 802.11. Bluetooth.: User Scenarios, Physical Layer, MAC layer,
Networking, Security, Link Management
GSM: Mobile Services, System Architecture, Radio Interface, Protocols,
Localization and calling, Handover, Security, and New Data Services.
Mobile Computing (MC): Introduction to MC, Novel Applications, Limitations,
and Architecture

UNIT – II
(Wireless) Medium Access Control (MAC): Motivation for a Specialized MAC
(Hidden and Exposed Terminals, Near and Far Terminals), SDMA, FDMA,
TDMA, CDMA. MAC Protocols for GSM, Wireless LAN (IEEE802.11),
Collision Avoidance (MACA, MACAW) Protocols.

UNIT – III
Mobile IP Network Layer: IP and Mobile IP Network Layers, Packet Delivery
and Handover Management, Location Management, Registration, Tunnelling
and Encapsulation, Route Optimization, DHCP.
Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP,
Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile
Networks.

UNIT – IV
Database Issues: Database Hoarding & Caching Techniques, Client–Server
Computing & Adaptation, Transactional Models, Query processing, Data

UNIT-V

TEXT BOOKS

REFERENCE BOOKS

Outcomes:
Ability to understand the strengths and limitations of mobile/wireless networks
Ability to design and analyze the performance of location update algorithms for cellular networks;

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IV Year B.Tech. IT/CST-I Sem
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(A70532) IMAGE PROCESSING AND PATTERN RECOGNITION
(ELECTIVE - I)

Objectives:
- Adequate background knowledge about image processing and pattern recognition
- Practical knowledge and skills about image processing and pattern recognition tools
- Necessary knowledge to design and implement a prototype of an image processing and pattern recognition application.

UNIT-I
Fundamental steps of image processing, components of an image processing system. The image model and image acquisition, sampling and quantization, relationship between pixels, distance functions, scanner. Statistical and spatial operations, Intensity functions transformations, histogram processing, smoothing & sharpening – spatial filters Frequency domain filters, homomorphic filtering, image filtering & restoration. Inverse and Weiner filtering, FIR Weiner filter. Filtering using image transforms, smoothing splines and interpolation.

UNIT-II
Morphological and other area operations, basic morphological operations, opening and closing operations, dilation erosion, Hit or Miss transform, morphological algorithms, extension to grey scale images. Segmentation and Edge detection region operations, basic edge detection, second order detection, crack edge detection, gradient operators, compass and Laplace operators, edge linking and boundary detection, thresholding, region based segmentation, segmentation by morphological watersheds.

UNIT-III
Image compression: Types and requirements, statistical compression, spatial compression, contour coding, quantizing compression, image data compression-predictive technique, pixel coding, transfer coding theory, lossy and lossless predictive type coding, Digital Image Water marking.

UNIT-IV
Representation and Description: Chain codes, Polygonal approximation, Signature Boundary Segments, Skeltons, Boundary Descriptors, Regional Descriptors, Relational Descriptors, Principal components for Description,
UNIT-V

Pattern Recognition Fundamentals: Basic Concepts of pattern recognition, Fundamental problems in pattern recognition system, design concepts and methodologies, example of automatic pattern recognition systems, a simple automatic pattern recognition model


TEXT BOOKS

REFERENCE BOOKS:
6. Pattern Recognition, R.Shinghal, Oxford University Press.

Outcomes:
Ability to apply computer algorithms to practical problems.
Ability to image segmentation, reconstruction and restoration.
Ability to perform the classification of patterns.
TEXT BOOKS:

REFERENCE BOOKS:
5. Artificial Intelligence and Intelligent Systems, N.P. Padhy, Oxford Univ. Press.

Outcomes:
- Ability to build intelligent machines using soft computing techniques
- Ability to apply fuzzy logic to handle uncertainty problems.
- Ability to apply neural networks for classifications.

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IV Year B.Tech. IT/CST-I Sem

(A70538) SEMANTIC WEB AND SOCIAL NETWORKS
(ELECTIVE - II)

Objectives:
- To learn Web Intelligence
- To learn Knowledge Representation for the Semantic Web
- To learn Ontology Engineering
- To learn Semantic Web Applications, Services and Technology
- To learn Social Network Analysis and semantic web

UNIT-I

Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

UNIT-II

Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping.

UNIT-III
Logic, Rule and Inference Engines, Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base.

UNIT-IV
XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods, What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks.

UNIT-V
Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.
TEXT BOOKS:

REFERENCE BOOKS:
4. Programming the Semantic Web, T. Segaran, C. Evans, J. Taylor, O'Reilly, SPD.

Outcomes:
- Ability to understand and knowledge representation for the semantic web.
- Ability to create ontology.
- Ability to build a blogs and social networks.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
IV Year B.Tech. IT/CST-I Sem
(A70352) OPERATIONS RESEARCH (ELECTIVE-I)

UNIT – I

UNIT – II

UNIT – III
Replacement: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely – Group Replacement.

UNIT – IV
Inventory: Introduction – Single item, Deterministic models – Purchase inventory models with one price break and multiple price breaks – Stochastic models – demand may be discrete variable or continuous variable – Single Period model and no setup cost.

UNIT – V
Simulation: Introduction, Definition, types of simulation models, Steps involved in the simulation process - Advantages and disadvantages - applications of simulation to queuing and inventory.

TEXT BOOK:
2. Introduction to O.R./ Hillier & Liberman/TMH

REFERENCE BOOKS:
1. Introduction to O.R. / Taha/ PHI
2. Operations Research/ NVS Raju/ SMS Education/ 3rd Revised Edition

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
IV Year B.Tech. IT/CST-I Sem

(A70540) SOFTWARE PROJECT MANAGEMENT
(Effective-II)

Objectives:
The main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achieving this goal, models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience-based creation & improvement of models (process management). The goals of the course can be characterized as follows:

1. Understanding the specific roles within a software organization as related to project and process management
2. Understanding the basic infrastructure competences (e.g., process modeling and measurement)
3. Understanding the basic steps of project planning, project management, quality assurance, and process management and their relationships

UNIT-I

UNIT-II

The old way and the new: The principles of conventional software engineering, principles of modern software management, transitioning to an iterative process.

UNIT-III
Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering
artifacts, programmatic artifacts. Model based software architectures: A Management perspective and technical perspective.

UNIT-IV


UNIT-V


Future Software Project Management: Modern Project Profiles Next generation.

Software economics, modern Process transitions.

Case Study: The Command Centre Processing and Display System Replacement (CCPDS-R).

TEXT BOOKS:

1. Software Project Management, Walker Royce, Pearson Education.

REFERENCE BOOKS:

1. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006
2. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007
5. The art of Project management, Scott Berkun, O'Reilly, 2005.

Outcomes:

At the end of the course, the student shall be able to:

- Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- Compare and differentiate organisation structures and project structures.
- Implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. IT - I Sem

BIG DATA ANALYTICS (ASSOCIATE ANALYTICS – II)
(Elective-I)

Unit I:
Data Management (NOS 2101):
Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors/Signal/RSIS etc. Data Management, Data Quality (noise, outliers, missing values, duplicate data) and Data Preprocessing.
Export all the data onto Cloud ex. AWS/Rackspace etc.
Maintain Healthy, Safe & Secure Working Environment (NOS 9003):
Introduction, workplace safety, Report Accidents & Emergencies, Protect health & safety as your work, course conclusion, assessment

Unit II
Big Data Tools (NOS 2101):
Introduction to Big Data tools like Hadoop, Spark, Impala etc., Data ETL process, Identify gaps in the data and follow-up for decision making.
Provide Data/Information in Standard Formats (NOS 9004):
Introduction, Knowledge Management, Standardized reporting & compliances, Decision Models, course conclusion. Assessment.

Unit III
Big Data Analytics:
Run descriptives to understand the nature of the available data, collate all the data sources to suffice business requirement, Run descriptive statistics for all the variables and observe the data ranges, Outlier detection and elimination.

Unit IV
Machine Learning Algorithms (NOS 9003):
Hypothesis testing and determining the multiple analytical methodologies, Train Model on 2/3 sample data using various Statistical/Machine learning algorithms, Test model on 1/3 sample for prediction etc.

Unit V
(NOS 9004)
Data Visualization (NOS 2101):
Prepare the data for Visualization, Use tools like Tableau, QuickView and D3, Draw insights out of Visualization tool.
Product Implementation

TEXT BOOK:
1. Student’s Handbook for Associate Analytics.

REFERENCE BOOKS:
5. Introduction to Data Mining, Tan, Steinbach and Kumar, Addison Wesley, 2006
8. (http://www.vistrails.org/index.php/Course:_Big_Data_Analysis)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. IT - I Sem

INFORMATION SECURITY ASSESSMENTS & AUDITS (SECURITY ANALYST – II)
(Elective-I)

Unit I
Information Security Performance Metrics and Audit:
Security Metrics and Reporting, Common Issues and Variances of Performance Metrics, Introduction to Security
Audit, Servers and Storage devices, Infrastructure and Networks, Communication Routes, Information Security
Methodologies (Black-box, White-box, Grey-box), Phases of Information Security Audit and Strategies, Ethics of
an Information Security Auditor etc.
Maintain Healthy, Safe & Secure Working environment (NOS 9003).

Unit II
Information Security Audit Tasks, Reports and Post Auditing Actions:
Pre-audit checklist, Information Gathering, Vulnerability Analysis, External Security Audit, Internal Network
Security Audit, Firewall Security Audit, IDS Security Auditing, Social Engineering Security Auditing, Web
Application Security Auditing, Information Security Audit Deliverables & Writing Report, Result Analysis, Post
Auditing Actions, Report Retention etc.
Provide Data/Information in Standard formats (NOS 9004).

Unit III
Vulnerability Management:
Information Security Vulnerabilities – Threats and Vulnerabilities, Human-based Social Engineering, Computer-
based Social Engineering, Social Media Countermeasures, Vulnerability Management – Vulnerability Scanning,
Testing, Threat management, Remediation etc.

Unit IV
Information Security Assessments:
Vulnerability Assessment, Classification, Types of Vulnerability Assessment, Vulnerability Assessment Phases,
Vulnerability Analysis Stages, Characteristics of a Good Vulnerability Assessment Solutions & Considerations,
Vulnerability Assessment Reports – Tools and choosing a Right Tool, Information Security Risk Assessment, Risk
Treatment, Residual Risk, Risk Acceptance, Risk Management Feedback Loops etc.

Unit V
Configuration Reviews:
Introduction to Configuration Management, Configuration Management Requirements-Plan-Control, Development
of configuration Control Policies, Testing Configuration Management etc.

TEXT BOOKS:
Prescribed books:
1. Assessing Information Security (strategies, tactics, logic and framework) by A Vladimirov, K.Gavrlenko, and
A.Michajlowski
2. "The Art of Computer Virus Research and Defense by Pete Sзор."

REFERENCES:
34180
UNIT-V

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

TEXT BOOKS:

REFERENCE BOOKS:

Outcomes:
• Students can animate scenes entertainment.
• Will be able work in computer aided design for content presentation.
• Better analogy data with pictorial representation.
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IV Year B.Tech. IT/CST-I Sem

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(A70531) HUMAN COMPUTER INTERACTION
(Elective - II)

Objectives:
You will gain an overview of Human-Computer Interaction (HCI), with an understanding of user interface design in general, and alternatives to traditional "keyboard and mouse" computing; become familiar with the vocabulary associated with sensory and cognitive systems as relevant to task performance by humans; be able to apply models from cognitive psychology to predicting user performance in various human-computer interaction tasks and recognize the limits of human performance as they apply to computer operation; appreciate the importance of a design and evaluation methodology that begins with and maintains a focus on the user; be familiar with a variety of both conventional and non-traditional user interface paradigms, the latter including virtual and augmented reality, mobile and wearable computing, and ubiquitous computing; and understand the social implications of technology and their ethical responsibilities as engineers in the design of technological systems. Finally, working in small groups on a product design from start to finish will provide you with invaluable teamwork experience.

UNIT- I


The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT- II

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.


UNIT- III


Components – text and messages, icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT- IV


UNIT- V


TEXT BOOKS:
1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia.

REFERENCE BOOKS:

Outcomes:
Ability to apply HCI and principles to interaction design.
Ability to design certain tools for blind or PH people.
Jawaharlal Nehru Technological University Hyderabad
IV Year B.Tech. IT/CST-I Sem

(A70537) SCRIPTING LANGUAGES
(Elective – II)

Objectives:
The course demonstrates an in depth understanding of the tools and the scripting languages necessary for design and development of applications dealing with Bio-information/ Bio-data. The instructor is advised to discuss examples in the context of Bio-data/ Bio-information application development.

UNIT – I
Introduction to PERL and Scripting: Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT – II
Advanced perl: Finer points of looping, pack and unpack, filesystem, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security issues.

UNIT – III
Advanced PHP Programming: PHP and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World.

UNIT – IV
TCL : TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures , strings , patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.

Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding, Perl-Tk.

UNIT – V
Python: Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling.


TEXT BOOKS:
1. The World of Scripting Languages, David Barron,Wiley Publications.

REFERENCE BOOKS:
1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. Programming Python,M.Lutz,SPD.
4. PHP 5.1, I.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.

Outcomes:
- Ability to understand the differences between scripting languages.
- Ability to apply your knowledge of the weaknesses of scripting languages to select implementation.
- Master an understanding of python especially the object oriented concepts.

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IV Year B.Tech. IT/CST-I Sem

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(A70528) COMPUTER FORENSICS
(Elective-II)

Objectives:
- A brief explanation of the objective is to provide digital evidences which are obtained from digital media.
- In order to understand the objectives of computer forensics, first of all, people have to recognize the different roles computer plays in a certain crime.
- According to a snippet from the United States Security Service, the functions computer has in different kinds of crimes.

UNIT – I


Types of Computer Forensics Technology: Types of Military Computer Forensic Technology, Types of Law Enforcement – Computer Forensic Technology - Types of Business Computer Forensic Technology


UNIT – II


Computer Image Verification and Authentication: Special Needs of Evidential Authentication – Practical Consideration – Practical Implementation

UNIT – III

Computer Forensics analysis and validation: Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions

Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honeynet project

Processing Crime and Incident Scenes: Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case

UNIT – IV

Current Computer Forensic tools: evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software

E-Mail Investigations: Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools

Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

UNIT – V

Working with Windows and DOS Systems: understanding file systems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS start up tasks, virtual machines.

TEXT BOOKS:

REFERENCE BOOKS:
1. Real Digital Forensics by Keith J. Jones, Richard Bejtlich, Curtis W. Rose, Addison- Wesley Pearson Education
5. Software Forensics Collecting Evidence from the Scene of a Digital Crime by Robert M. Slade, TMH 2005

6. Windows Forensics by Chad Steel, Wiley India Edition

Outcomes:
- Students will be understanding the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
- It gives an opportunity to students to continue their zeal in research in computer forensics.

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IV Year B.Tech. IT/CST-I Sem

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(A70593) CASE TOOLS AND SOFTWARE TESTING LAB

Objectives:
- Understand how UML supports the entire OOAD process.
- Become familiar with all phases of OOAD.
- Understand different software testing techniques and strategies.
- Understand the procedure to write test plan and execution.
- Understand different software testing tools and their features

CASE TOOLS LAB

Students are divided into batches of 5 each and each batch has to draw the following diagrams using UML for an ATM system whose description is given below.

UML diagrams to be developed are:
1. Use Case Diagram.
2. Class Diagram.
3. Sequence Diagram.
5. State Diagram
6. Activity Diagram.
7. Component Diagram
8. Deployment Diagram.

Description for an ATM System

The software to be designed will control a simulated automated teller machine (ATM) having a magnetic stripe reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot for depositing envelopes, a dispenser for cash (in multiples of Rs. 100, Rs. 500 and Rs. 1000), a printer for printing customer receipts, and a key-operated switch to allow an operator to start or stop the machine. The ATM will communicate with the bank's computer over an appropriate communication link. The software on the latter is not part of the requirements for this problem.

The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) - both of which will be sent to the bank for validation as part of each transaction.
The customer will then be able to perform one or more transactions. The card will be retained in the machine until the customer indicates that he/she desires no further transactions, at which point it will be returned except as noted below.

The ATM must be able to provide the following services to the customer:

1. A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiples of Rs. 100 or Rs. 500 or Rs. 1000. Approval must be obtained from the bank before cash is dispensed.
2. A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.
3. A customer must be able to make a transfer of money between any two accounts linked to the card.
4. A customer must be able to make a balance inquiry of any account linked to the card.
5. A customer must be able to abort a transaction in progress by pressing the Cancel key instead of responding to a request from the machine.

The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. Ordinarily, a transaction will be considered complete by the bank once it has been approved. In the case of a deposit, a second message will be sent to the bank indicating that the customer has deposited the envelope. (If the customer fails to deposit the envelope within the timeout period, or presses cancel instead, no second message will be sent to the bank and the deposit will not be credited to the customer.)

If the bank determines that the customer’s PIN is invalid, the customer will be required to re-enter the PIN before a transaction can proceed. If the customer is unable to successfully enter the PIN after three tries, the card will be permanently retained by the machine, and the customer will have to contact the bank to get it back.

If a transaction fails for any reason other than an invalid PIN, the ATM will display an explanation of the problem, and will then ask the customer whether he/she wants to do another transaction.

The ATM will provide the customer with a printed receipt for each successful transaction.

The ATM will have a key-operated switch that will allow an operator to start and stop the servicing of customers. After turning the switch to the "on" position, the operator will be required to verify and enter the total cash on hand. The machine can only be turned off when it is not servicing a customer. When the switch is moved to the "off" position, the machine will shut down, so that the operator may remove deposit envelopes and reload the machine with cash, blank receipts, etc.

Outcomes:
- Ability to understand the history, cost of using and building CASE tools.
- Ability to construct and evaluate hybrid CASE tools by integrating existing tools.
- Ability to deliver the product with qualitative.

SOFTWARE TESTING LAB

List of Experiments:
1. Write programs in ‘C’ Language to demonstrate the working of the following constructs:
   - i) do while ii) while...do iii) if...else iv) switch v) for
   Introspect the causes for its failure and write down the possible reasons for its failure.
3. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.
4. Write the test cases for any known application (e.g. Banking application)
5. Create a test plan document for any application (e.g. Library Management System)
6. Study of any testing tool (e.g. Win runner)
7. Study of any web testing tool (e.g. Selenium)
8. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
9. Study of any test management tool (e.g. Test Director)
10. Study of any open source testing tool (e.g. Test Link)
11. Take a mini project (e.g. University admission, Placement Portal) and execute it. During the Life cycle of the mini project create the various testing documents* and final test report document.

*Note: To create the various testing related documents refer to the text "Effective Software Testing Methodologies by William E. Perry"

3) Run the installer (for example, for Windows it is: sun_java_wireless_toolkit-2.5.2-windows.exe). The installer checks whether a compatible Java environment has been pre-installed. If not, it is necessary to uninstall old versions of Java and perform Step 1 again.

Once after successful installation of Java and the tool kit compile this program and run the following program in the toolkit.

Steps to run this program in toolkit:
1. Start -> All Programs -> Sun Java Tool Kit -> Wireless Tool Kit
2. Click New Project – Enter Project Name -> Enter Class Name -> Click on Create Project.
3. Choose appropriate API Selection and Configurations.
4. Place Java Source file in WTK2.1 / WTK2.2 / apps / projectname / src
5. Build the Project.
6. Run the Project.

```java
import javax.microedition.lcdui.*;
import javax.microedition.midlet.*;
public class HelloWorld extends MIDlet{
    private Form form;
    private Display display;
    public HelloWorld(){
        super();
    }
    public void startApp(){
        form = new Form("Hello World");
        String msg = "Hello World!!!!!!!";
        form.append(msg);
        display = Display.getDisplay(this);
        display.setCurrent(form);
    }
    public void pauseApp(){
    }
    public void destroyApp(boolean unconditional){
        notifyDestroyed();
    }
```

Mobile Application Development (Through J2ME) LABORATORY

**Objective:**
In this lab, a student is expected to design, implement, document and present a mobile client/server system using standard Java and Java 2 Micro Edition (J2ME) platform. Specifically it is required to design and implement a system that consists mainly of a mobile client (MC) and a Proxy Server (PS). MC will be written in J2ME, MIDP 2.0, while PS will be written in standard Java. It is necessary to use a mobile phone emulator to develop and demonstrate the experiments.

It may be necessary to use other components or existing resources (servers) as needed. For instance a database local to PS or a web service available on the Internet that can be invoked by the PS.

**Week - 1: Installation of Java Wireless Toolkit (J2ME)**
1) If the Java Development Kit (JDK) is not there or only having the Java Runtime Environment (JRE) installed, install the latest JDK from http://java.sun.com/javase/downloads/index.jsp. Current stable release of Java is JDK 6 Update 7 but check the web page in case there are newer non-beta releases available.
Week - 2 Working with J2ME Features:
Working with J2ME Features: Say, creating a Hello World program Experiment with the most basic features and mobile application interaction concepts (lists, text boxes, buttons, radio boxes, soft buttons, graphics, etc).

2.1 Create a program which creates the following kind of menu:
* cut
* copy
* paste
* delete
* select all
* unselect all

2.2 Event Handling.
Create a menu which has the following options:
* cut - can be on/off
* copy - can be on/off
* paste - can be on/off
* delete - can be on/off
* select all - put all 4 options on
* unselect all - put all 4 options off

2.3. Input checking
Create an MIDP application which examine, that a phone number, which a user has entered is in the given format.
* Area code should be one of the following: 040, 041, 050, 0400, 044
* There should 6-8 numbers in telephone number (+ area code)

slide program returns to the first slide.

3.2 High-level UI
Create a MIDP application, which show the user 5-10 quiz questions. All questions have 4 possible options and one right option exactly. Application counts and shows to the user how many right answers were right and shows them to user.

3.3 Create a MIDP application, where the user can enter player name and points. The program saves the information to the record using RMS at MIDP device. Program should also print out the top 10 player list to the end user. You can use this class in your game if you made own class for saving and reading record sets.

Week - 3 Threads & High Level UI:
3.1. Create a slide show which has three slides, which includes only text. Program should change to the new slide after 5 seconds. After the third
Creating the Datagram Server project
1) Click on Wireless Toolkit 2.5.2 under the group: All Programs?Sun Java
(TM) Wireless Toolkit 2.5.2.
2) Click on 'New Project...' button.
3) Enter project name as 'DatagramServer'. Enter MIDlet name as
'DatagramServer'. Note that the MIDlet name is the same as the name of
the class in the source code, which extends the MIDlet class, otherwise the
application won't run.
4) Another window pops up where it is required to select a target platform.
Select 'MIDP 1.0' from the drop down list.
5) After clicking OK, the project is created; and the Wireless Toolkit tells that
the name of the folder where source code files are created. The path of the
source code folder is displayed in the debug output window.

Creating and Compiling the DatagramServer source files
The Wireless Toolkit does not come with an IDE by default so Use any IDE
or a text editor like Notepad.
1) Create a new text file called DatagramServer.java in the source folder of
the project. The exact path of this folder is displayed in the Wireless Toolkit
window.
2) Paste contents DatagramServer.java from into the source file.

Running your Server application on the Phone simulator
1) After compiling the project successfully, click on the Run button in
the Wireless Toolkit window.
2) A graphical window depicting a phone handset will appear with the
name of your application highlighted on its screen as shown below.
3) To start the application, click on the right soft-key (marked with a dot)
below the 'Launch' command.
4) The phone simulator might ask if it is OK to run the network application.
Select 'Yes' by clicking on the appropriate soft-key. The server is
now up and running.
5) Keep the server running during the creation, compilation and running
of the Datagram Client application.

Creating the DatagramClient project
1) Use the same instance of the Wireless Toolkit that is used for creating
and compiling the Datagram Server project.
2) Click on 'New Project...' button.
3) A new window pops up. Enter project name as 'DatagramClient'.
Enter MIDlet name as 'DatagramClient'. Note that the MIDlet name
is the same as the name of the class in the source code, which extends the MIDlet class.

4) Another window pops up where one has to select a target platform. Select ‘MIDP 1.0’ from the drop down list.

5) After clicking OK, the project is created and the Wireless Toolkit tells where to place the source code files. The path of the source code folder is displayed in the debug output window as explained before.

Creating and Compiling the DatagramClient source files

1) Create a new text file called DatagramClient.java in the source folder of the project.

2) Paste contents DatagramClient.java into the source file.

3) Then click on the Build button in the Wireless Toolkit window. If the compilation is OK, it will say Build Complete in the window’s debug output window, otherwise it will show the errors. Note: In the source code, use the System.out.println() statement to output debug information to this window.

Running your Client application on the Phone simulator

1) After compiling the project successfully, click on the Run button in the Wireless Toolkit window.

2) A graphical window depicting a phone handset will appear with the name of the application highlighted on its screen.

3) To start the application, click on the right soft-key (marked with a dot) below the ‘Launch’ command.

4) The phone simulator might ask if it is OK to run the network application. Select ‘Yes’ by clicking on the appropriate soft-key. The client is now up and running.

5) When the client executes on the phone simulator, one should see a text box with the caption ‘Message’. Enter any message and press the right soft-key (corresponding to Send). If the client-server application is working properly, the screen of the server phone will display the message sent by the client and the client screen will now display a message sent by the server in response. The response message from the server is the original client message in reverse.

6) Try various features of the phone simulator including the different look-and-feel options.

Week - 6 Authentication with a Web Server

6.1 Write a sample program to show how to make a SOCKET Connection from J2ME phone.

This J2ME sample program shows how to how to make a SOCKET