| AICTE VI SEMESTER COMPUTER SCIENCE &ENGG. | | | | | | | |
|---|---|---|---|---|---|---|---|
| COURSE CONTENTS (UEC SCHEME) | | | | | | | |
| CS-6301 | Compiler Design | L | T | P | C | Max. Marks | Min. Marks |
| Duration | 5 Hours | 2 | 1 | 2 | 4 | 70 | 22 |

**Course Description**:

The course is intended to teach the students the basic techniques that underlie the practice of Compiler Construction. The course will introduce the theory and tools that can be standardly employed in order to perform syntax-directed translation of a high-level programming language into an executable code.It also focuses on various designs of Compiler and structuring and optimizing various phases of a Compiler

**Course Objective**

- Understand the basic concepts and application of Compiler Design.
- To learn how to construct compiler to translate High Level Languages to Machine Language.
- To learn different phases of compiler and how to implement them.
- To learn efficient machine Language Code Generation using the techniques of Optimization.

**Syllabus**

**Unit I:**

**Introduction of compiler & Lexical Analysis**: Phases and passes, Bootstrapping, Finite state machines and regular expressions and their applications to lexical analysis, implementation of lexical analyzers, LEecification of programming languages: Context free grammars, derivation and parse trees, capabilities of CFGX-compiler, Formal grammars and their application to syntax analysis, ambiguity, The syntactic sp

**Unit-II:**

**Syntax Analysis:**Parsers, Shift reduce parsing, operator precedence parsing, top down parsing, predictive parsers Automatic Construction of efficient Parsers: LR parsers, the canonical Collection of LR(0) items, constructing SLR parsing tables, constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars, an automatic parser generator, YACC tool.

**Unit-III:**

**Syntax-directed Translation**: Syntax-directed Translation schemes, Intermediate code, postfix notation, Parse trees & syntax trees, three address code, quadruple & triples, Translation of simple statements and control flow statements, Type checking, Type conversions, Equivalence of type expressions, Overloading of functions and operations.

**Unit-IV:**

**Run Time Environment and Error Recovery**: Source Language Issues, Storage Organization, Storage-Allocation Strategies, and Access to Non local Names, Parameter Passing, Symbol Tables, and Language Facilities for Dynamic Storage Allocation, Dynamic Storage Allocation Techniques, Error Detection & Recovery, Ad-Hoc and Systematic Methods.

**Unit V:**

**Code Generation and Code Optimization:**Issues in the Design of a Code Generator, The Target Machine, Run-Time Storage Management, Basic Blocks and Flow Graphs, Next-Use Information, A

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| **COURSE CONTENTS (UEC SCHEME)** | | | | | | | |
| CS6302 | Network and Web Security | L | T | P | C | Max. Marks | Min. Marks |
| Duration | 3 Hours | 2 | 1 | 0 | 3 | 70 | 22 |

**Course Description:**

Student will learn the concept of cryptography and network security for information communication systems. The course emphasis on Symmetric and Asymmetric cryptosystem, key management scheme, security algorithms and analysis e.g., DES, DDDES, AES, RSA,RC4 Message authentication function, network security and attacks, wireless security, firewall.

**Course Objectives:**

- To gain knowledge about the mathematics of the cryptographic algorithms and get an insight into the working of different existing cryptographic algorithms
- To comprehend and apply authentication services, authentication algorithms and
- To comprehend and apply network layer security protocols,
- Explain Transport layer security protocols, Web security protocols, wireless network security threats.
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**Syllabus:**

**Unit-I**

Introduction to Cryptography and cryptanalysis, OSI Security Architecture, Attacks and Security goals,Security Services and mechanism, Security Model, Mathematics of Cryptography: Integer Arithmetic, Modular Arithmetic, Matrices, Linear Congruence, Algebraic Structure, Prime Test and Factorization.

**Unit-II**

Symmetric Ciphers,Classical Encryptions Techniques: Substitution, Transposition, steganography; Mathematics of Symmetric Key, Block Cipher and Data Encryption, DES principle and Design standards, Differential and Linear Cryptanalysis, AES and its analysis, Triple DES, stream cipher and RC4, Confidentiality using symmetric encryption.

**Unit-III**

Number Theory, Public-Key Cryptography and RSA, Key management, Diffe-Hellman Key Exchange, Elliptic Curve Cryptography, Message Authentication and Hash Functions, Security of Hash function and MACs, Secure Hash Algorithm, Whirlpool, HMAC, CMAC,Digital Signature.

**Unit-IV**

Network Security: Authentication protocol, Authentication Application, Kerberos, X.509, Public-Key Infrastructure, E-Mail Security: PGP, S/MIME, Secure Socket Layer, Transport Layer Security.

**Unit-V**

**Unit-V**

IP Security overview, IP Security Architecture, Authentication Header, Payload, Web Security, Secure Electronic Transaction, System Security: Intrusion Detection, Password management, Malicious software, Virus and Worms, DDOS attack, Firewalls.

**Course Outcomes:**

- Ability to understand the basic concepts of symmetric cryptosystem, public key cryptosystem and digital signature scheme
- Ability to reason about the security of cryptographic constructions
- Ability to break the cryptosystems that are not secure
- Be able to determine appropriate mechanisms for protecting the network.
- Design a security solution for a given application with respect to security of the system

**Text Books:**


1. W. Stallings,"Cryptography and Network Security Principles and practice", 5/e, Pearson Education Asia, 2013
2. Behrouz A. Forouzan and DebdeepMukhopadhyay, "Cryptography and Network Security", 2nd edition, Tata McGraw Hill, 2013


**Reference Books**


1. Thomas Koshy, "Elementary Number Theory with Applications", Elsevier India, 2005.
2. Stinson. D. Cryptography: Theory and Practice, 3rd edition, Chapman & Hall/CRC, 2012
3. Aaron E. Earle, "Wireless Security Handbook", Auerbach publications, Taylor & Francis, 2006.
4. Online course: course on cryptography by Dan Boneh.

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| **COURSE CONTENTS (UEC SCHEME)** | | | | | | | |
| **CS6303** | **Computer Graphics and Multimedia** | **L** | **T** | **P** | **C** | **Max. Marks** | **Min. Marks** |
| Duration | 3 Hours | 2 | 1 | 2 | 4 | 70 | 22 |

**Course Description:**
The purpose of this subject is to introduce the concepts and techniques used in Computer Graphics , Animations & Multimedia.

**Course Objective**

- **To develop an understanding and awareness how issues such as content, information architecture, motion, sound, design, and technology merge to form effective and compelling interactive experiences for a wide range of audiences and end users.**
- To become familiar with various software programs used in the creation and implementation of multi- media
- To appreciate the importance of technical ability and creativity within design practice.
- To gain knowledge about graphics hardware devices and software used.
- To understand the two-dimensional graphics and their transformations.

**Syllabus**

**Unit-I**

Introduction to Raster Scan displays, Pixels, Frame buffer, Vector & Character generation, Random Scan systems, Display devices, Scan Conversion techniques, Line Drawing: simple DDA, Bresenham's Algorithm, Circle Drawing Algorithms: Midpoint Circle drawing and Bresenham's Algorithm, Polygon fill algorithm: Boundary-fill and Flood-fill algorithms

**Unit-II**

2-D Transformation: Translation, Rotation, Scaling, Shearing, Reflection. Inverse Transformation, Homogenous coordinate system, Matrices Transformation, Composite Transformation. Windowing & Clipping: World Coordinate System, Screen Coordinate System, Viewing Transformation, Line Clipping & Polygon Clipping Algorithms

**Unit-III**

3-D Transformations: Translation, Rotation and Scaling. Parallel & Perspective Projection: Types of Parallel & Perspective Projection, Hidden Surface elimination: Depth comparison, Back face detection algorithm, Painter's Algorithm, Z-Buffer Algorithm. Curve generation, Bezier and Bspline methods. Basic Illumination Model: Diffuse reflection, Specular reflection, Phong Shading, Gouraud shading, Ray Tracing, Color models like RGB, YIQ, CMY, HSV.

**Unit-IV**

Multimedia : Characteristics of a multimedia presentation , Uses of Multimedia, Text –Types, Unicode Standard ,text Compression, Text file formats, Audio- Components of an audio system, Digital Audio, Digital Audio processing, Sound cards, Audio file formats ,Audio Processing software ,Video-Video color spaces, Digital Video, Digital Video processing, Video file formats.

**Unit –V**

Animation: Uses of Animation, Principles of Animation, Computer based animation, 3D Animation, Animation file formats, Animation softwares. Compression: Lossless/Lossy Compression techniques, Image, Audio & Video Compressions, MPEG Standards ,Multimedia Architecture, Multimedia databases

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| **COURSE CONTENTS (UEC SCHEME)** | | | | | | | |
| CS631X[redacted] | **Data Mining** | L | T | P | C | Max. Marks | Min. Marks |
| Duration | 3 Hours | 2 | 1 | 0 | 3 | 70 | 22 |

**Course Descriptions:**
On completion of this course, the student will get familiar with identifying the scope and essentiality of Data Warehousing and Mining. Students will be able to analyze data, choose relevant models and algorithms for respective applications. Students will gain research interest towards advances in data mining.

**Course Objectives:**

- To learn the fundamentals of Data Warehouse fundamentals, Data Mining Principles, features and services.
- To understand the designing of data warehouse with dimensional modelling and apply OLAP operations
- To identify appropriate data mining algorithms to solve real world problems
- To understand different data mining techniques like classification, prediction, clustering and association rule mining

**Syllabus:**

**Unit I**

Introduction, to Data warehousing, needs for developing data Warehouse, Data warehouse systems and its Components, Design of Data Warehouse, Dimension and Measures, Data Marts:-Dependent Data Marts, Independents Data Marts & Distributed Data Marts, Conceptual Modeling of Data Warehouses:-Star Schema, Snowflake Schema, Fact Constellations. Multidimensional Data Model & Aggregates.

**Unit II**

OLAP, Characteristics of OLAP System, Motivation for using OLAP, Multidimensional View and Data Cube, Data Cube Implementations, Data Cube Operations, Guidelines for OLAP Implementation, Difference between OLAP & OLTP, OLAP Servers:- ROLAP, MOLAP, HOLAP Queries.

**Unit III**

Introduction to Data Mining, Knowledge Discovery, Data Mining Functionalities, Data Mining System categorization and its Issues. Data Processing :- Data Cleaning, Data Integration and Transformation. Data Reduction, Data Mining Statistics. Guidelines for Successful Data Mining.

**Unit IV**

Association Rule Mining:-Introduction, Basic, The Task and a Naïve Algorithm, Apriori Algorithms, Improving the efficiency of the Apriori Algorithm, Apriori-Tid, Direct Hasing and Pruning(DHP),Dynamic Itemset Counting (DIC), Mining Frequent Patterns without Candidate Generation(FP-Growth),Performance Evaluation of Algorithms,.

**Unit V**

Classification:-Introduction, Decision Tree, The Tree Induction Algorithm, Split Algorithms Based on Information Theory, Split Algorithm Based on the Gini Index, Overfitting and Pruning, Decision Trees Rules, Naïve Bayes Method. Cluster Analysis:- Introduction, Desired Features of Cluster Analysis, Types of Cluster Analysis Methods:- Partitional Methods, Hierarchical Methods, Density- Based Methods, Dealing with Large Databases. Quality and Validity of Cluster Analysis Methods.

**Course Outcomes:**

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| COURSE CONTENTS (UEC SCHEME) | | | | | | | |
| EC6351 | Internet of Things | L | T | P | C | Max. Marks | Min. Marks |
| Duration | 3 Hours | 2 | 1 | 0 | 3 | 70 | 22 |

**Course Description:**
Students will be explored to the interconnection and integration of the physical world and the cyber space. They are also able to design & develop IOT Devices

**Course Objective**

- To Understand the basic concepts and application of Internet of Things
- To build a small low cost embedded system using Arduino / Raspberry Pi or equivalent boards.
- To apply the concept of Internet of Things in the real world scenario
- Able to realize the revolution of Internet in Mobile Devices, Cloud &Sensor Networks

**Syllabus**

**Unit I:**
**Introduction**: Definition, Characteristics of IOT, IOT Conceptual framework, IOT Architectural view, Physical design of IOT, Logical design of IOT, Application of IOT.

**Unit-II:**
Machine-to-machine (M2M), SDN (software defined networking) and NFV (network function virtualization) for IOT, data storage in IOT, IOT Cloud Based Services

**Unit-III:**
**Design Principles for Web Connectivity:** Web Communication Protocols for connected devices, Message Communication Protocols for connected devices, SOAP, REST, HTTP Restful and Web Sockets. Internet Connectivity Principles: Internet Connectivity, Internet based communication, IP addressing in IOT, Media Access control.

**Unit-IV:**
**Sensor Technology**: Sensor Technology, Participatory Sensing, Industrial IOT and Automotive IOT, Actuator, Sensor data Communication Protocols, Radio Frequency Identification Technology, Wireless Sensor Network Technology

**Unit V:**
**IOT Design methodology:** Specification -Requirement, process, model, service, functional &operational view. IOT Privacy and security solutions, Raspberry Pi & Arduino devices. IOT Case studies: smart city streetlights control & monitoring.

**Course Outcomes:**
Upon the completion of the course the student should be able to

- Design a portable IoT using Arduino/ equivalent boards and relevant protocols.
- Develop web services to access/control IoT devices.
- Deploy an IoT application and connect to the cloud.