# Department of Information Technology
# Central University of Kashmir
# Tullamull Campus, Ganderbal.

## Syllabus for B. Tech. CSE 6th Semester
## [18/7/2019]

| S. No | Course Code | Course Title | Credits | Evaluation | | |
|---|---|---|---|---|---|---|
| | | | | CIA | ESE | Total |
| 1. | BTCS 601 | Software Engineering | 4 | 40 | 60 | 100 |
| 2. | BTCS 602 | Computer Networks | 4 | 40 | 60 | 100 |
| 3. | BTCS 603 | Design of Algorithm | 4 | 40 | 60 | 100 |
| 4. | BTCS 604 | Theory of Computation | 4 | 40 | 60 | 100 |
| 5. | BTCS - | Elective 1 | 4 | 40 | 60 | 100 |
| 6. | BTCS 605 | Industrial Training * | - | CA | | |
| | | Total | 20 | | | |

| ELECTIVE I | | | | | | |
|---|---|---|---|---|---|---|
| S. No | Course Code | Course Title | Credits | Evaluation | | |
| | | | | CIA | ESE | Total |
| 1. | BTCS 610 | Cryptography & Information Security | 4 | 40 | 60 | 100 |
| 2. | BTCS 611 | E-Commerce | 4 | 40 | 60 | 100 |
| 3. | BTCS 612 | Enterprise Resource Planning (ERP) | 4 | 40 | 60 | 100 |
| 4. | BTCS 613 | Information Retrieval | 4 | 40 | 60 | 100 |
| 5. | BTCS 614 | Visual Programming | 4 | 40 | 60 | 100 |

**BTCS 601: Software Engineering**

**Unit- I**

Software Engineering Fundamentals: Software Engineering, Software Product: Software development paradigms, software Characteristics and Application. Software Development life cycle, water fall model, Prototyping, Incremental & Spiral model, 4th Generation Techniques. Project Management: Concepts, Software Process and Project Metrics; Software Measurements; Software Projects Planning: Objectives, Scope and Resources.

**Unit- II**

Software Requirement System (SRS) and Analysis: System Engineering, Product Engineering: Characteristics of a Good SRS, Requirement analysis, Principal, Software prototyping. Analysis modelling: data modelling, DFD, ER- Diagrams, Data Dictionary (DD).Software Project Planning: Empirical Estimation Models: COCOMO Model, Software Equation, Project Scheduling and Tracking. Risk management. Software Requirement Analysis.

**Unit- III**

Software Quality Assurance(SQA):Quality and factors, Quality Assurance, Software Quality Metrics, Process and Product Quality, Capability Maturity Model (CMM). Need for SQA, SQA Planning & Standards, Software Reliability and Reliability Measures. Introduction to Software Testing: Need of software(s/w) testing, Error, fault and failure. Levels of Testing: Unit Testing, Integration Testing, System Testing, Acceptance Testing, Alpha testing & Beta testing, Static vs. Dynamic testing, Manual vs. Automatic testing.

**Unit- IV**

Testing Types, Control flow analysis, Cyclometric Analysis. Black Box & White Box Testing, Syntax testing, Structural Testing, Validation testing Activities, Low level testing, High level testing. Engineering aspects of Software production, necessity of automation. Job responsibilities of Software Engineers as Software developers. Software Maintenance: Management of Maintenance, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation.

**References:**

1. Software Engineering – A Practitioners Approach Roger S. Pressman, Mcgraw Hill, International Education.
2. An Integrated Approach To software Engineering, PankajJolote, ,Narosa

3. Software Engineering – A Programming Approach, D. Belie I. Moray, J. Rough,PHI.
4. Software Testing Techniques, Barrios Bier, Van N Ostrand Reinhold.
5. Software Engineering Concepts- Richard Fairley, CDAC. Tata McGraw-Hill Series.

## BTCS 602: Computer Networks

**Unit 1: Introduction**

Introduction, advantages and limitations of computer networking overview of network building blocks, Concept of Layered Architecture, OSI & TCP/IP Models, Characteristics of Peer to Peer, Server based, Broadcast & Point to Point networks. Packet switching, Datagram & Virtual Circuit network, Hubs, bridges, switches, Routers & Gateways.

**Unit 2: Data Link Layer and Internetworking**

Data Link Layer: Data Link Layer design issues, Framing, Flow control, Error Detection and Correction; DLL Protocol: Stop and Wait Protocol, Sliding window protocol ,STP, DLC, PPP .LLC and MAC sub layer protocol, ARQ based error control, Data Link Protocols: HDLC, SLIP, PPP, CSMA/CD & CSMA/CA, 802.11 Wireless LAN, 802.15 and 802.16.Tunneling, Fragmentation, IP addressing (IPV4 & IPV6), Subnetting, CIDR/VLSM DHCP, Internet protocols: IP, ICMP,NAT,PAT, ARP, RARP, RIP, OSPF, EGP & BGP.

**Unit 3: Transport Layer Protocols**

TCP/IP suite: Quality, of service, Hand shaking (connection management), Transport service primitives and buffering, Multiplexing, The TCP protocol, The TCP segment header, TCP, TCP transmission policy, TCP congestion control, TCP timer management. TCP, UDP, and SCTP. Introduction to SONET/SDH, X.25, Frame Relay and ATM Networks.

**Unit 4: Presentation and Application Layer**

Presentation and Application Layer: Client/Server Model, Network File System (NFS), Remote Login: Telnet, SSH; File Transfer Protocol (FTP); E-mail System: Simple Mail Transfer Protocol (SMTP), Post Office Protocol (POP);World Wide Web (WWW), Domain Name System (DNS), DNS Servers; Hyper Text Transfer Protocol (HTTP)

**References:**


1. A.S. Tanenbaum, “Computer Networks”, Pearson Education (Fourth edition).
2. Computer Network ,S.S.Shinde ,New Age International Publisher.
3. Data and computer Communication ,Shashibanzal ,Firewall media
4. Computer Networks: A Systems Approach, Larry L. Peterson and Bruce S. Davie, Tata McGraw Hill CompanyAddison Wesley Publishing Co. 2004
5.Computer Networks: Protocols standards and interfaces , by Uyless Black, Prentice Hall.2002.
6. Keshav S., "An Engineering Approach to Computer Networking", Perason Education.
7. Comer D., "Computer Networks and Internet".
8. Gallo M., Hancock W., "Computer Communications and networking Technologies", Thomson Brooks/Cole.

## BTCS 603: Design of Algorithm

**Unit I :** Introduction: Algorithm Design paradigms- motivation, concept of algorithmic efficiency, run time analysis of algorithms, Asymptomatic Notations. Divide & Conquer: Structure of divide and conquer algorithms: examples, Binary search, Quick sort, analysis of divide and conquer run time reference relations.

**Unit II :** Greedy method: Overview of the greedy paradigm, examples of exact optimization solution (minimum cost spanning tree), approximate solution (Knapsack problem), single source shortest paths .Dynamic Programming: Overview, difference between dynamic programming and divide and conquer, applications: shortest path in graph, matrix multiplication, travelling salesman problem, longest common sequence.

**Unit III:** Graph searching and traversal: Overview, traversal methods, depth first and breadth first search. Back Tracking: Overview, 8-queen problem and Knapsack problem.

**Unit IV:** Branch & Bound: LC searching, bounding, FIFO branch and bound, Applications: 0/1 Knapsack problem, Travelling salesman problem. Computational complexity: Complexity measures, Polynomial vs Non-Polynomial time complexity; NP hard and NP complete classes, examples.

**References:**


1. T. H. Cormen, C. E. Leiserson, R. L. Rivest, Clifford Stein, “Introduction to Algorithms”, 2nd Ed., PHI.
2. Ellis Horowitz and Sartaz Sahani, “Computer Algorithms”, Galgotia Publications.
3. V. Aho, J. E. Hopcroft, J. D. Ullman, “The Design and Analysis of Computer Algorithms”, Addition Wesley.
4. D. E. Knuth, “The Art of Computer Programming”, 2nd Ed., Addison Wesley.

**BTCS604 : Theory of Computation**

**UNIT – I**

Basic Concepts: Symbols, Strings, Language, Formal Language, Natural Language. Basic Machine and Finite State Machine.

FSM without output: Definition and Construction- DFA, NFA, NFA with epsilon-Moves, Minimization Of FA, Equivalence of NFA and DFA, Conversion of NFA with epsilon moves to NFA, Conversion of NFA With epsilon moves to DFA.

FSM with output: Definition and Construction of Moore and Mealy Machines, Inter- conversion between Moore and Mealy Machines.

Regular Expressions: Definition and Identities of Regular Expressions, Construction of Regular Expression of the given L, Construction of Language from the RE, Construction of FA from the given RE using direct method, Conversion of FA to RE using Arden's Theorem, Pumping Lemma for RL, Closure properties of RLs, Applications of Regular Expressions.

**UNIT – II**

Introduction, Formal Definition of Grammar, Notations, Derivation Process: Leftmost Derivation, Rightmost Derivation, derivation trees, Context Free Languages, Ambiguous CFG, Removal of ambiguity, Simplification of CFG, Normal Forms, Chomsky Hierarchy, Regular grammar, equivalence of RG (LRG and RLG) and FA.

Push Down Automata: Introduction and Definition of PDA, Construction (Pictorial/ Transition diagram) of PDA, Instantaneous Description and ACCEPTANCE of CFL by empty stack and final state, Deterministic PDA Vs Nondeterministic PDA, Closure properties of CFLs, pumping lemma for CFL.

**UNIT –III**

Formal definition of a Turing machine, Recursive Languages and Recursively Enumerable Languages, Design of Turing machines, Variants of Turing Machines: Multi-tape Turing machines, Universal Turing Machine, Nondeterministic Turing machines. Comparisons of all automata.

**UNIT – IV**

Decidability: Decidable problems concerning regular languages, Decidable problems concerning context- free languages, Un-decidability, Halting Problem of TM.

Time Complexity: Measuring Complexity, The Class P, The Class NP, Examples of problems in NP, NP-completeness.

## References:

1. Michael Sipser, Introduction to the Theory of Computation, CENGAGE Learning, 3rdEdition ISBBN13:978-81-315-2529-6.
2. Vivek Kulkarni, Theory of Computation, Oxford University Press, ISBN-13: 978-0-19-808458-7.
3. Hopcroft Ulman, Introduction to Automata Theory, Languages and Computations, Pearson Education Asia, 2nd Edition, ISBN: 9788131720479.
4. DanielI. A. Cohen, Introduction to Computer Theory, Wiley-India, ISBN: 978-81-265-1334-5.
5. K.L.P Mishra, N. Chandrasekaran, Theory of Computer Science (Automata, Languages and Computation), Prentice Hall India, 2nd Edition.
6. John C. Martin, Introduction to Language and Theory of Computation, TMH, 3rd Edition, ISBN: 978-0-07-066048-9.
7. Kavi Mahesh, Theory of Computation: A Problem Solving Approach, Wiley-India, ISBN: 978-81-265-3311-4.
8. Kavi Mahesh, Theory of Computation: A Problem Solving Approach, Wiley India, ISBN: 9788126533114
9. Daniel Cohen, Introduction to Computer Theory, Wiley India, ISBN: 9788126513345,2ed
10. Basavaraj S.Anami, Karibasappa K.G, Formal Languages and Automata Theory, Wiley India, ISBN: 9788126520107

**ELECTIVE I**

## Cryptography & Information Security

**Unit I**

Overview : Computer Security Concepts , Services, Mechanisms and Attacks. A Model of Network Security.

Classical Encryption Techniques : Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography.

**Unit II**

Block Cipher : Simplified DES, Block Cipher Principles, The DES, The Strength of DES, Differential and Linear Cryptanalysis. Triple DES, Blowfish. Public Key Encryption: Number Theory, Prime Numbers, Testing for Primality.

**Unit III**

Public Key Cryptography and RSA : Principles of Public Key Cryptosystems, The RSA Algorithms,

Key Management: Diffie-Hellman Key Exchange.Message Authentication Requirements, Authentication Functions,

Cryptographic Data Integrity: Applications of Cryptographic Hash Function, SHA-512, Message Authentication Code, HMAC,. Digital Signatures: Properties, Attacks and Forgeries and Requirements.

**Unit IV**

Network Security **:** Authentication Applications , Kerberos.

Electronic Mail Security : Pretty Good Privacy.

IP Security : Overview, IP Security Policy, IPsec Services, Transport and Tunnel mode.

System Security - Intruders, Malicious Software, Viruses and Related Threats,

Counter Measures, Overview of Firewalls.

***References:***


1. William Stallings, Cryptography and Network Security, 5th Edition, Pearson Education/PHI. 2012
2. William Stallings, Network Security Essentials, Applications and Standards, 4th Edition, Pearson Education/PHI. 2012

3. Charlie Kaufman, Radia Perlman, Mike Speciner, Network Security: Private Communication in Public World, 2nd Edition,2011, Pearson Education.

# E-Commerce

## Unit I

Introduction to E-Commerce- Definition, Evolution, -Internet –Technology Concepts, Limitations Of Internet, Future Of Internet. -WWW Web Servers, Clients, Email, Search Engines, Chat, Music, Video.
Internet Marketing Technologies – Databases, Datawarehouse and Data mining.
E-Commerce Business Models – Key elements of Business Models, Business to consumer (B2C) Business model, Business-to-Business (B2B) Business model, Consumer to Consumer Business model

## Unit II

Building E-Commerce- System Development life Cycle, Choosing Software andhardware. E-commerce Site Tools-HTML-Authenticating HTML, Building Blocks of HTML,Page Design, Site Design,Linking HTML Documents, Adding Images, audio and video. Creating Forms in HTML, Using different input types in HTML Forms.
E-Commerce Security – Security threats, technology solutions to threats and protection. Policies, procedures and Laws- E-Commerce Payment Systems : Cash, Checking transfer, Credit card, stored value and accumulating Balance

## Unit III

Credit Card E-Commerce Transactions: Working, Credit Card Enablers, Limitations of Online payment systems- Digital Payment Systems : Digital Wallets, Digital Cash, Smart Cards as stored value systems- B2B Payment Systems : Electronic Billing presentment and payment.
Ethical, Social and Political Issues in E-Commerce : Responsibility, Accountability and Liability.- Privacy and Information Rights : Privacy and Legal Protections, Private industry self-regulation, Privacy Advocacy groups.- Intellectual Property Rights : Types, Copyright and Patent.

## Unit IV

Net Marketplaces – Characteristics of Net Marketplaces, Types of Net Marketplace, E-Distributors, E-Procurement, Exchanges. Auctions, Portals and online communities
Online Content Providers- Digital copyrights and Electronic publishing, Entertainment industry

## References:

1. KenethLaudon & Traver, “E-commerce”, Pearson Edu. New Dellhi.
2. Cady, G.H. and Part McGreger, “The Internet” BPB Pub., Delhi
3. Carpenter, Phil e Brands, HBS Press, Boston,2000
4. Keen, Peter and Mark McDonald The e-Process Edge, Delhi, Tata McGraw.

# Information Retrieval

## Unit I

Information Retrieval: Information Retrieval using Boolean model, processing Boolean queries, Tolerant Retrieval, Wildcard queries, Spelling Correction, Phonetic correction.

## Unit II

Information search:
Index construction, Dynamic indexing, Index compression, vector space retrieval, Evaluation in information retrieval, Similarity search.

## Unit III

Probabilistic IR:
Probabilistic Information retrieval, Language model of information retrieval, Bottom up and Top down partitioning paradigms, Clustering and visualization via embedding.

## Unit IV

Learning in IR:
Supervised Learning, Evaluating Text classifiers, Nearest Neighbors Learners, Bayesian Learners, Hypertext Classification, Semi supervised Learning.

**References:**

1. Mining th e Web, Discovering Knowledge from Hypertext Data, Soumen Chakrabarti, Allied Elsivier Publication, 2007.
2. Information Retrieval by Manning and Ravindran, Cambridge University press, Draft 2007.

**Enterprise Resource Planning (ERP)**

**Unit I**

Enterprise Resources Planning: Evolution of ERP-MRP and MRP-II-problems of system islands -need for system integration and interface- early ERP Packages- ERP products and Market opportunities and problems in ERP selection and implementation. Identifying ERP benefits team formation- consultant intervention- selection ERP-process of ERP implementation – Managing changes in IT organization –Preparing IT infrastructure – Measuring benefits of ERP.

**Unit II**

Integrating With other systems: Post ERP, Modules in ERP: Business Modules of ERP package,
Reengineering Concepts: the emergence of Reengineering Concept; Concept of business Process- rethinking of processes –identification of Reengineering need -preparing for Reengineering –implementing change – change management –BPR & ERP.

**Unit III**

Supply chain Management: The concept of value chain differentiation between ERP & SCM -SCM for customer focus -need and specificity of SCM -SCM scenario in India -products and markets of Sehl -issues in selection and implementation of SCM solutions -CRM solutions.

**Unit IV**

Evolution of E-commerce, EDI and E-business –business opportunities – basic and advanced business on Internet –Internet banking and related technologies –security and privacy issues –technologies for E-business, Future and growth of E-Business.

**References:**

1. Hammer, Mcheal and Jamts Chamby Reengineering the corporation, 1997.
2.Leon, Alexix Countdown 2000, Tata MC Graw
3.Ptak, Carol A. & Eli Schragenheim ERP, St. Lucie Press NY, 2000.
4.JosephBrady,EllenMonk,Bret Wagner- Concepts in Enterprise Resource Planning
5.Bret Wagner- Enterprise Resource Planning

# Visual Programming

**Unit** -I

Visual programming , advantages and disadvantages of programming , visual basics application development cycle , Rapid application development tools , Visual interface components , default functionality of interface components , event driven programming , different templates of visual basic programming ,interface ,basic modes , Event procedures , client server applications

**Unit** -II

Controls and Properties. What is control , intrinsic controls , Extrinsic controls , form , list box, combo box , radio button , option button , frame , check box , scroll bar, text box , button , label , shape , picure , pointer , drive list , file list , Dir list , image , data , OLE, standard controls , custom controls , H scroll , V scroll ,.

**Unit** -III

Programming Fundamentals .Variables , Declaring variable , storing and Retrieving variables , variable data types , Scope and life time of variables , Data types modules , procedures , exit statement , control array functions , operators , control structures , decision structures , loop structures . Menues , SDI and MDI .Introduction , SDI , MDI, dialogue box , displaying dialogues , model dialogue box , modeless dialogue box , system model , predefined dialogue box , custom dialogue box , MDI applications , menus in MDI applications , system functions ,.

**Unit** -IV

Database Programming .Introduction , database management , data access object , data binding , data control , database object , record set object , types of record set object , properties of data control , important methods of data object , important methods of record set object , methods and property of field object , methods of records set object , properties of record set object , important events of data control , DAO, ADO , RDO.

References:


1. Mastering in visual basics BY E. Petroutos
2. Mastering in VB By Evangelous , BPB Publishing
3. Viuasl Basic 6 By Scottsdal , AZ