ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY
GUWAHATI

Course Structure and Syllabus
(From Academic Session 2018-19 onwards)

B.TECH
COMPUTER SCIENCE AND ENGINEERING

6TH SEMESTER

ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY
Guwahati
Course Structure

(From Academic Session 2018-19 onwards)

B. Tech 6th Semester

Semester VI/ B.TECH/Computer Science and Engineering

Sl. No.	Sub-Code	Subject	Hours per Week			Credit	Marks	
			L	T	P	C	CE	ESE
Theory								
1	CSE181601	Compiler Design	3	0	0	3	30	70
2	CSE181602	Computer Networks	3	0	0	3	30	70
3	CSE1816PE2*	Program Elective-2	3	0	0	3	30	70
4	CSE1816PE3*	Program Elective-3	3	0	0	3	30	70
5	CSE1816OE1*	Open Elective-1	3	0	0	3	30	70
6	HS181606	Accountancy	2	0	0	2	30	70
Practical								
1	CSE181611	Compiler Design Lab	0	0	2	1	15	35
2	CSE181612	Computer Networks Lab	0	0	2	1	15	35
3	CSE181621	Mini Project	0	0	6	3	50	100
TOTAL			**17**	**0**	**10**	**22**	**260**	**590**
Total Contact Hours per week: 27								
Total Credits: 22								

N.B. 4-6 weeks Mandatory Industry Internship need to be done in the 6th semester break and the report is to be submitted and evaluated in 7th semester

PROGRAMME ELECTIVE–2 SUBJECTS		
Sl. No	**Subject Code**	**Subject**
1	CSE1816PE21	Data Mining
2	CSE1816PE22	Advanced Computer Architecture
3	CSE1816PE2*	Any other subject offered from time to time with the approval of the University

PROGRAMME ELECTIVE–3 SUBJECTS		
Sl. No	**Subject Code**	**Subject**
1	CSE1816PE31	Image Processing
2	CSE1816PE32	Ad hoc and Sensor Networks
3	CSE1816PE33	Real Time Systems
4	CSE1816PE3*	Any other subject offered from time to time with the approval of the University

OPEN ELECTIVE–1 SUBJECTS		
Sl. No	**Subject Code**	**Subject**
1	CSE1816OE11	Software Engineering
2	CSE1816OE12	Information Theory and Coding
3	CSE1816OE13	Fault Tolerant Computing
4	CSE1816OE1*	Any other subject offered from time to time with the approval of the University

Detail Syllabus:

Course Code	Course Title	Hours per week L-T-P	Credit C
CSE181601	**Compiler Design**	**3-0-0**	**3**

MODULE 1:
Introduction: Phases of compilation and overview. Lexical Analysis (scanner): Regular languages, finite automata, regular expressions, from regular expressions to finite automata, scanner generator (LEX, flex)

MODULE 2:
Syntax Analysis (Parser): Context-free languages and grammars, push-down automata, LL(1) grammars and top-down parsing, operator grammars, LR(O), SLR(1), LR(1), LALR(1) grammars and bottom-up parsing, ambiguity and LR parsing, LALR(1) parser generator (YACC, bison)

MODULE 3:
Semantic Analysis: Attribute grammars, syntax directed definition, evaluation and flow of attribute in a syntax tree, Symbol Table: Its structure, symbol attributes and management. Run-time environment: Procedure activation, parameter passing, value return, memory allocation, and scope

MODULE 4:
Intermediate Code Generation: Translation of different language features, different types of intermediate forms. Code Improvement (optimization): Analysis: control-flow, data-flow dependence etc.; Code improvement local optimization, global optimization, loop optimization, peep-hole optimization etc. Architecture dependent code improvement: instruction scheduling (for pipeline), loop optimization (for cache memory) etc. Register allocation and target code generation Advanced topics

MODULE 5:
Type systems, data abstraction, compilation of Object Oriented features and non-imperative programming languages

Textbooks/Reference Books:

1. Compilers: Principles, Techniques, and Tools, by A.V. Aho, Monica Lam, Ravi Sethi, and J.D. Ullman, (2nd ed.), Addison-Wesley, 2007
2. K.D. Cooper, and Linda Torczon, Engineering a Compiler, Morgan Kaufmann, 2004.
3. K.C. Louden, Compiler Construction: Principles and Practice, Cengage Learning, 1997.
4. D. Brown, J. Levine, and T. Mason, LEX and YACC, O‟Reilly Media, 1992.

Course Code	Course Title	Hours per week L-T-P	Credit C
CSE181602	**Computer Networks**	**3-0-0**	**3**

MODULE 1:
Data communication Components: Representation of data and its flow Networks, Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN: Wired LAN, Wireless LANs, Connecting LAN and Virtual LAN, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum

MODULE 2:
Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA

MODULE 3:
Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping –ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols

MODULE 4:
Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm

MODULE 5:
Application Layer: Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts of Cryptography

Textbooks/Reference Books:

1. Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGraw-Hill
2. Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice Hall India
3. Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition
4. Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India
5. TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison-Wesley, United States of America

Course Code	Course Title	Hours per week L-T-P	Credit C
CSE1816PE21	**Data Mining**	**3-0-0**	**3**

MODULE 1:
Introduction: Basic concepts of data mining, including motivation and definition; different types of data repositories; data mining functionalities; concept of interesting patterns; data mining tasks; current trends, major issues and ethics in data mining

MODULE 2:
Data: Types of data and data quality; Data Preprocessing: data cleaning, data integration and transformation, data reduction, discretization and concept hierarchy generation; Exploring Data: summary statistics, visualization, multidimensional data analysis

MODULE 3:
Association and Correlation Analysis: Basic concepts: frequent patterns, association rules - support and confidence; frequent item set generation – Apriori algorithm, FP-Growth algorithm; Rule generation, Applications of Association rules; Correlation analysis

MODULE 4:
Clustering Algorithms and Cluster Analysis: Concept of clustering, measures of similarity, Clustering algorithms: Partitioning methods - k-means and k-medoids, CLARANS, Hierarchical methods - agglomerative and divisive clustering, BIRCH, Density based methods - Subspace clustering, DBSCAN; Graph-based clustering - MST clustering; Cluster evaluation; Outlier detection and analysis

MODULE 5:
Classification: Binary Classification - Basic concepts, Bayes theorem and Naïve Bayes classifier, Association based classification, Rule based classifiers, nearest neighbor classifiers, Decision Trees, Random Forest; Perceptrons; Multi-category classification; Model Over fitting, Evaluation of classifier performance - cross validation, ROC curves

MODULE 6:
Applications: Text mining, Web data analysis, Recommender systems

Textbooks/Reference books:

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Introduction to Data Mining, Pearson (2005), India
2. Jiawei Han and MichelineKamber, Data Mining: Concepts and Techniques, Morgan Kaufmann, 3rd edition(2011)
3. Ian H. Witten and Eibe Frank, Data Mining: Practical Machine Learning Tools and Techniques, MorganKaufmann, 3rd edition (2011)
4. T. Hastie, R. Tibshirani and J. H. Friedman, The Elements of Statistical Learning, Data Mining, Inference, andPrediction, Springer, 2nd Edition, 2009
5. C. M. Bishop, Pattern Recognition and Machine Learning, Springer, 1st edition, 2006

Course Code	Course Title	Hours per week L-T-P	Credit C
CSE1816PE22	Advanced Computer Architecture	3-0-0	3

MODULE 1:
Review of Basic Organization and Architectural Techniques: RISC processors, Characteristics of RISC processors, RISC Vs CISC, Classification of Instruction Set Architectures, Review of performance measurements, Basic parallel processing techniques: instruction level, thread level and process level, Classification of parallel architectures

MODULE 2:
Instruction Level Parallelism: Basic concepts of pipelining, Arithmetic pipelines, Instruction pipelines, Hazards in a pipeline: structural, data, and control hazards, Overview of hazard resolution techniques, Dynamic instruction scheduling, Branch prediction techniques, Instruction-level parallelism using software approaches, Superscalar techniques, Speculative execution, Review of modern processors, Pentium Processor: IA 32 and P6 micro architectures, ARM Processor

MODULE 3:
Memory Hierarchies, Basic concept of hierarchical memory organization, Main memories, Cache memory design and implementation, Virtual memory design and implementation, Secondary memory, technology, RAID

MODULE 4:
Peripheral Devices, Bus structures and standards, Synchronous and asynchronous buses, Types and uses of storage devices, Interfacing I/O to the rest of the system, Reliability and availability, I/O system design, Platform architecture

MODULE 5:
Thread Level Parallelism, Centralized vs. distributed shared memory, Interconnection topologies, Multiprocessor architecture, Symmetric multiprocessors, Cache coherence problem, Synchronization, Memory consistency, Multi core architecture, Review of modern multiprocessors

MODULE 6:
Process Level Parallelism: Distributed computers, Clusters, Grid Mainframe computers

Textbooks / References:
1. Hennessy and Patterson, Computer Architecture: A Quantitative Approach, Morgan Kaufmann: 4th Edition
2. Kai Hwang , Advanced Computer Architecture, McGraw Hill
3. Sima D, Fountain T. and Kacsuk P., Advanced Computer Architectures: A design space approach, Pearson Education

Course Code	Course Title	Hours per week L-T-P	Credit C
CSE1816PE31	Image Processing	3-0-0	3

MODULE 1: Introduction
Light, Brightness adaption and discrimination, Pixels, coordinate conventions, Imaging Geometry, Perspective Projection, Spatial Domain Filtering, sampling and quantization

MODULE 2: Spatial Domain Filtering
Intensity transformations, contrast stretching, histogram equalization, Correlation and convolution, Smoothing filters, sharpening filters, gradient and Laplacian

MODULE 3: Filtering in the Frequency Domain
Hotelling Transform, Fourier Transforms and properties, FFT (Decimation in Frequency and Decimation in Time Techniques), Convolution, Correlation, 2-D sampling, Discrete Cosine Transform, Frequency domain filtering

MODULE 4: Image Restoration
Basic Framework, Interactive Restoration, Image deformation and geometric transformations, image morphing, Restoration techniques, Noise characterization, Noise restoration filters, Adaptive filters, Linear, Position invariant degradations, Estimation of Degradation functions, Restoration from projections

MODULE 5: **Image Compression**
Encoder-Decoder model, Types of redundancies, Lossy and Lossless compression, Entropy of an information source, Shannon's 1st Theorem, Huffman Coding, Arithmetic Coding, Golomb Coding, LZW coding, Transform Coding, Sub-image size selection, blocking artifacts, DCT implementation using FFT, Run length coding, FAX compression (CCITT Group-3 and Group-4), Symbol-based coding, JBIG-2, Bit-plane encoding, Bit-allocation, Zonal Coding, Threshold Coding, JPEG, Lossless predictive coding, Lossy predictive coding, Motion Compensation

MODULE 6: Wavelet based Image Compression
Expansion of functions, Multi-resolution analysis, Scaling functions, MRA refinement equation, Wavelet series expansion, Discrete Wavelet Transform (DWT), Continuous Wavelet Transform, Fast Wavelet Transform, 2-D wavelet Transform, JPEG-2000 encoding, Digital Image Watermarking

MODULE 7: Morphological Image Processing
Basics, SE, Erosion, Dilation, Opening, Closing, Hit-or-Miss Transform, Boundary Detection, Hole filling, connected components, convex hull, thinning, thickening, skeletons, pruning, Geodesic Dilation, Erosion, Reconstruction by dilation and erosion

MODULE 8: Image Segmentation
Boundary detection based techniques, Point, line detection, Edge detection, Edge linking, local processing, regional processing, Hough transform, Thresholding, Iterative thresholding, Otsu's method, Moving averages, Multivariable thresholding, Region-based segmentation, Watershed algorithm, Use of motion in segmentation

Textbooks / References:

1. Digital Image Processing by Rafael C Gonzalez & Richard E Woods, 3rd Edition
2. Fundamentals of Digital Image Processing by Anil K Jain
3. Digital Image Processing by William K Pratt

Course Code	Course Title	Hours per week L-T-P	Credit C
CSE1816PE32	**Ad hoc and Sensor Networks**	**3-0-0**	**3**

MODULE 1:
Fundamentals of Wireless Communication Technology – The Electromagnetic Spectrum – Radio propagation Mechanisms – Characteristics of the Wireless Channel -mobile ad hoc networks (MANETs) and wireless sensor networks (WSNs): concepts and architectures, Applications of Ad Hoc and Sensor networks, Design Challenges in Ad hoc and Sensor Networks

MODULE 2:
MAC Protocols for Ad Hoc Wireless Networks: Issues in designing a MAC Protocol- Classification of MAC Protocols- Contention based protocols-Contention based protocols with Reservation Mechanisms- Contention based protocols with Scheduling Mechanisms – Multi channel MAC-IEEE 802.11

MODULE 3:
Routing Protocols and Transport Layer in Ad Hoc Wireless Networks: Issues in designing a routing and Transport Layer protocol for Ad hoc networks- proactive routing, reactive routing (on-demand), hybrid routing- Classification of Transport Layer solutions-TCP over Ad hoc Wireless Networks

MODULE 4:
Wireless Sensor Networks (WSNs) And Mac Protocols: Single node architecture: hardware and software components of a sensor node – WSN Network architecture: typical network architectures-data relaying and aggregation strategies -MAC layer protocols: self-organizing, Hybrid TDMA/FDMA and CSMA based MAC- IEEE 802.15.4 and Zigbee, underwater WSN

MODULE 5:
WSN Routing, Localization & QoS: Issues in WSN routing – OLSR- Localization – Indoor and Sensor Network Localization-absolute and relative localization, triangulation-QOS in WSN-Energy Efficient Design-Synchronization-Transport Layer issues, security

Textbooks/Reference Books:

1. C. Siva Ram Murthy, and B. S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols" Prentice Hall Professional Technical Reference, 2008

2. Carlos De Morais Cordeiro, Dharma Prakash Agrawal, "Ad Hoc & Sensor Networks: Theory and Applications", World Scientific Publishing Company, 2006

Course Code	Course Title	Hours per week L-T-P	Credit C
CSE1816PE33	**Real Time Systems**	**3-0-0**	**3**

MODULE 1:

Introduction: Real - Time System Characteristics, Basic Issues, Modeling Timing Constraints, basics of Real - Time Task Scheduling, Cyclic Scheduler, Event - Driven Scheduling, Rate Monotonic Scheduler, Deadline Monotonic Scheduling

MODULE 2:

Resource Sharing Among Real-Time Tasks, Highest Locker and Priority Ceiling Protocols, An Analysis of Priority Ceiling Protocol, Handling Task Dependencies, Real-Time Task Scheduling on Multiprocessors and Distributed Systems

MODULE 3:

Clock Synchronization in Distributed Real-Time Systems, Internal Clock Synchronization in Presence of Byzantine Clocks

MODULE 4:

Basic Issues in Real-Time Operating Systems, Unix and Windows as RTOS, Real - Time POSIX, Open Source and Commercial RTOS, Benchmarking Real - Time Computer & Operating Systems

MODULE 5:

Real - Time Communications, Real - Time Communication in a LAN, Real - Time Communication over Packet Switched Networks, Real - Time Databases

Textbooks/Reference Books:

1. Rajib Mall, "Real-Time Systems: Theory and Practice," Pearson, 2008.

2. Jane W. Liu, "Real-Time Systems" Pearson Education, 2001

3. Krishna and Shin, "Real-Time Systems," Tata McGraw Hill. 1999

Course Code	Course Title	Hours per week L-T-P	Credit C
CSE1816OE11	Software Engineering	3-0-0	3

MODULE 1:

Software Process – Introduction – S/W Engineering Paradigm – life cycle models (waterfall, incremental, spiral, WINWIN spiral, evolutionary, prototyping) – system engineering – computer based system – life cycle process – development process

MODULE 2:

Software Requirements – Functional & non-functional – user-system requirement engineering process – feasibility studies – elicitation – validation & management – software prototyping – S/W documentation – Analysis and modeling

MODULE 3 :

Design Concepts and Principles – modular design – design heuristic – S/W architecture – data design – architectural design – transform & transaction mapping – Introduction to SCM process – Software Configuration Items, Abstraction Architecture, pattern modularity, information hiding, design classes, refactoring etc., Design of web application, architectural design, component level design, user interface design

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MODULE 4:

Software Testing and Quality Management – Taxonomy of S/W testing – levels - black box testing – testing boundary conditions – structural testing — regression testing– S/W testing strategies – unit testing – integration testing – validation testing – system testing and debugging, Quality concepts, quality assurance, software reviews, statistical quality assurance.

MODULE 5 :

Software Project Management - S/W cost estimation – Function point models – COCOMO model – Delphi method – S/W challenges – S/W maintenance.

Textbooks/Reference Books:

1. R. S. Pressman, Software Engineering - A practitioners approach, III Edition, McGraw Hill International editions, 1992
2. Ian Sommerville, Software Engineering, Pearson Education Asia, VI Edition, 2000
3. PankajJalote, An Integrated Approach to software Engineering, Springer Verlag, 1997
4. James F. Peters and WitoldPedryez, Software Engineering – An Engineering Approach, John Wiley and Sons, New Delhi

Course Code	Course Title	Hours per week L-T-P	Credit C
CSE1816OE12	Information Theory and Coding	3-0-0	3

MODULE 1:
Information theory: Concept of amount of information, information units Entropy: marginal, conditional, joint and relative entropies, relation among entropies, mutual information, information rate, chain rules, data-processing inequality, Fano's inequality, Asymptotic Equipartition Property Theorem, consequences of the AEP: data compression, high-probability sets and the typical set

MODULE 2:
Source coding – Encoding techniques, purpose of encoding, instantaneous codes, construction of instantaneous codes, Kraft's inequality, coding efficiency and redundancy, source coding theorem. construction of basic source codes – Shannon Fano coding, Shannon Fano Elias coding, Huffman coding, Minimum variance Huffman coding, Adaptive Huffman coding, arithmetic coding, dictionary coding – LZ77, LZ78, LZW, ZIP coding, Channel coding, Channel coding theorem for discrete memoryless channels

MODULE 3:
Channel capacity, redundancy and efficiency of channels, discrete channels – symmetric channels, Binary Symmetric Channel, Binary Erasure Channel, Noise-Free Channel, Channel with independent I/O, Cascaded channels, repetition of symbols, Binary asymmetric channel, Properties of Channel Capacity, Jointly Typical Sequences, Channel Coding Theorem, Fano's Inequality and the Converse to the Coding Theorem

MODULE 4:
Codes for error detection and correction – Parity check coding, Linear block codes, Error detecting and correcting capabilities, Generator and Parity check matrices, Standard array and Syndrome decoding, Hamming codes, Cyclic codes – Generator polynomial, Generator and Parity check matrices, Encoding of cyclic codes, Syndrome computation and error detection, Decoding of cyclic codes, BCH codes, RS codes, Burst error correction

MODULE 5:
Convolutional codes – Encoding and State, Tree and Trellis diagrams, Maximum likelihood decoding of convolutional codes -Viterbi algorithm, Sequential decoding -Stack algorithm. Interleaving techniques – Block and convolutional interleaving, Coding and interleaving applied to CD digital audio system - CIRC encoding and decoding, interpolation and muting. ARQ – Types of ARQ, Performance of ARQ, Probability of error and throughput

Textbooks/Reference Books:

1. T. M. Cover, J. A. Thomas, Elements of Information Theory, Wiley
2. R. Togneri, C.J.S de Silva, Fundamentals of Information Theory and Coding Design, Taylor and Francis
3. R. J. McEliece, The Theory of Information and Coding, Cambridge University Press
4. R. Bose, Information Theory Coding and Cryptography, Tata McGraw Hill
5. William Ryan, Shu Lin, Channel Codes: Classical and Modern, Cambridge University Press

Course Code	Course Title	Hours per week L-T-P	Credit C
CSE1816OE13	**Fault Tolerant Computing**	**3-0-0**	**3**

MODULE 1:
Basic concepts and overview of the course Faults and their manifestations, Mathematical Reliability Modelling, Probability Basics; Reliability and Availability Modelling, Analysis using Markov Models, performance reliability trade-offs

MODULE 2:
Hardware Fault-Tolerance, Canonical and Resilient Structures; Reliability Evaluation Techniques and Models; Processor-level Fault Tolerance; Byzantine Failures and Agreements

MODULE 3:
Information Redundancy Error Detection/Correction Codes (Hamming, Parity, Checksum, Berger, Cyclic, Arithmetic); Encoding/Decoding circuits; Resilient Disk Systems (RAID)

MODULE 4:
Software Fault-Tolerance Single-Version Fault Tolerance; N-Version Programming; Recovery Approach; Exception and Conditional (Assert) Handling; Reliability Models

MODULE 5:
Fault-Tolerant Networks, Network Topologies and their Resilience; Fault-tolerant Routing

MODULE 6:
Fault-Tolerant System Design/Applications: Defect-tolerance in VLSI Designs; Fault Detection in Cryptographic Systems, Mobile computing and Mobile communication environment, Fault Tolerant Distributed Systems, Checkpointing in Distributed and Shared-memory Systems

Textbooks/Reference Books:

1. Israel Koren and C. Mani Krishna; Fault-Tolerant Systems; Morgan-Kaufman Publishers, 2007
2. Elena Dubrova; Fault-Tolerant Design; Springer, 2013
3. Michael R. Lyu; Handbook of Software Reliability Engineering; IEEE Computer Society Press (and McGraw-Hill), 1996
4. Martin L. Shooman; Reliability of Computer Systems and Networks: Fault Tolerance, Analysis, and Design; John Wiley & Sons Inc., 2002
5. Kishor S. Trivedi; Probability and Statistics with Reliability, Queuing and Computer Science Applications; John Wiley & Sons Inc., 2016

Course Code	Course Title	Hours per week L-T-P	Credit C
HS181606	**Accountancy**	**2-0-0**	**2**

MODULE 1:
Concept and classification of Accounts, Transaction, Double Entry system of Book Keeping, Golden rules of Debit and Credit, Journal- Definition, advantages, Procedure of Journalising, Ledger, advantages, rules regarding Posting, Balancing of Ledger accounts, Trial Balance- Definition, objectives, procedure of preparation

MODULE 2:
Name of Subsidiary Books, Cash Book-definition, advantages, objectives, types of Cash Book, preparation of different types of cash books, Bank Reconciliation Statement, Regions of disagreement between Cash Book with Pass Book balance, preparation of Bank Reconciliation Statement

MODULE 3:
Final Account: Preparation of Trading Account, Profit and Loss Account with adjustments

MODULE 4:
Concept of Capital Expenditure and revenue Expenditure, Bad debts, Provision for Bad and Doubtful debts, Provision for discount on Debtors, Outstanding expenses, Prepaid expenses, Accrued Income

MODULE 5:
Introduction to Depreciation Accounting- Meaning, causes, factors, methods of charging depreciation etc.

Textbooks/Reference Books:

1. Theory and Practice of accountance- KR Das, KM Sinha, KS Pal Choudhury, Dr. A Rahman, PK Pujary
2. Book- Keeping & Accountancy- C Mohan Juneja, J R C Chawla, KK Sakseena
3. Double Entry Book- Keeping & Accountancy- JR Batliboi

Course Code	Course Title	Hours per week L-T-P	Credit C
CSE181611	**Compiler Design Lab**	**0-0-2**	**1**

LIST OF EXPERIMENTS

1. Write a program to recognize strings specified by a regular expression (use finite automaton)

2. Design and implement a predictive parser for a given grammar

3. Design and implement an LALR parser for a given grammar

4. Implement a lexical analyzer using lex/flex or any other lexical analyzer generator

5. Implement a parser using Yacc for a given grammar

6. Write a program to generate machine code for a given grammar

Course Code	Course Title	Hours per week L-T-P	Credit C
CSE181612	**Computer Networks Lab**	**0-0-2**	**1**

1. **Implementation of Elementary TCP Sockets** [Socket address structures – Byte ordering functions – Address conversion functions – Elementary TCP sockets – Socket – Connect – Bind – Listen – Accept – Read – Write – Close functions – Iterative server – Concurrent server]

2. **Implementation of Application Development TCP Echo Server** [TCP echo client –POSIX signal handling – Server with multiple clients – Boundary conditions– Server process crashes–Server host crashes – Server crashes and reboots – Server shutdown – I/O multiplexing – I/O models – Select function – Shutdown function – TCP echo server (with multiplexing) – Poll function – TCP echo client (with multiplexing)]

3. **Implementation of Socket Options, Elementary UDP SOC Sockets:** [Socket options – Getsocket and setsocket functions – Generic socket options – IP socket options – ICMP socket options – TCP socket options – Elementary UDP sockets – UDP echo server – UDP echo client – Multiplexing TCP and UDP sockets – Domain Name System – Gethostbyname function – IPV6 support in DNS – Gethostbyadr function – Getservbyname and etservbyport functions]

4. **Implementation of Advanced Sockets** [IPV4 and IPV6 interoperability – Threaded servers – Thread creation and termination– TCP echo server using threads – Mutexes – Condition variables – Raw sockets – Raw socket creation – Raw socket output – Raw socket input – Ping program – Trace route program]

5. **Implementation of Simple Network Management SNMP** [SNMP management information – Standard MIB‘s – SNMP V1 protocol and practical issues – Introduction to RMON, SNMP V2 and SNMP V3]

6. **Configuration of Layer 3 Switch and Router** [Modular field-replaceable Layer 3 switches & routers with integrated router, firewall and VPN functionalities, creating VLAN and checking]

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