Bachelor of Technology (Computer Science & Engineering)
Scheme of Studies/Examination
Semester VIII

S. No.	Course No.	Subject	L:T:P	Hours/ Week	Examination Schedule				Duration of Exam (Hrs.)
					Major Test	Minor Test	Practical	Total	
1	CSE 402N	Neural Networks & Fuzzy Logic	4:0:0	4	75	25	0	100	3
2	PE-III	Elective*-III	4:0:0	4	75	25	0	100	3
3	PE-IV	Elective* - IV	4:0:0	4	75	25	0	100	3
4	CSE 404N	Mobile Apps Development	4:0:0	4	75	25	0	100	3
5	CSE 406N	Mobile Apps Development Lab	0:0:2	2	0	40	60	100	3
6	CSE 408N	Computer Hardware & Troubleshooting Lab	0:0:2	2	0	40	60	100	3
7	CSE 410N	Project-II	0:0:9	09	0	100	100	200	3
8	CSE 424N	General Fitness & Professional Aptitude			0	0	100	100	8
		Total		**29**	**300**	**280**	**320**	**900**	

Code	PE-III	Code	PE-IV
CSE-412N	Software Testing	CSE-418N	Parallel Computing
CSE-414N	Graph Theory	CSE-420N	Cloud Computing
CSE-416N	Data Mining	CSE-422N	Natural Language Processing

Note:
***The students will choose any two departmental electives courses out of the given elective list in VIII Semester.**

CSE-402N	Neural Networks & Fuzzy Logic					
Lecture	**Tutorial**	**Practical**	**Major Test**	**Minor Test**	**Total**	**Time**
4	**0**	**0**	**75**	**25**	**100**	**3 Hrs.**
Purpose	**To provide knowledge of various artificial neural networks, fuzzy logic techniques and Genetic Engineering approach for optimization**					
Course Outcomes (CO)						
CO1	To learn the basics of artificial neural networks concepts.					
CO2	Expose detailed explanation of various neural networks architecture.					
CO3	To explore knowledge of special types of Artificial neural networks.					
CO4	To explore fuzzy logic techniques and genetic algorithms in neural networks.					

Unit I: Fundamentals of Artificial Neural Networks

Introduction: Concepts of neural networks, Characteristics of Neural Networks, Applications of Neural Networks. Fundamentals of Neural Networks: The biological prototype, Neuron concept, Single layer Neural Networks, Multi-Layer Neural Networks, terminology, Notation and representation of Neural Networks, Training of Artificial Neural Networks. Representation of perceptron, perceptron learning and training, Classification, linear Separability

Unit II: Neural Networks

Hopfield nets: Structure, training, and applications, Back Propagation: Concept, Applications and Back Propagation Training Algorithms. Counter Propagation Networks: Kohonan Network, Grossberg Layer & Training, applications of counter propagation, Image classification.
Bi-directional Associative Memories: Structure, retrieving a stored association, encoding associations.

Unit III: Special Neural Networks

ART: ART architecture, ART classification operation, ART implementation and characteristicsof ART. Image Compression Using ART, Optical Neural Networks: Vector Matrix Multipliers, Hop field net using Electro optical matrix multipliers, Holographic correlator, Optical Hopfield net using Volume Holograms, Cognitrons and Neocognitrons: structure and training.

Unit IV: Fuzzy Logic

Fuzzy Logic:Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets,Membership Function, Fuzzy rule generation, Operations on Fuzzy Sets: Compliment, Intersections,Unions, Combinations of Operations, Aggregation Operations, Fuzzy Arithmetic: Fuzzy Numbers,Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations, Introduction of Neuro-Fuzzy Systems, Architecture of Neuro Fuzzy Networks, Genetic Algorithms: genetic algorithm implementation in problem solving and working of genetic algorithms evolving neural networks, Differential Evolution optimization for engineering problems.

Text Books:

1. Li Min Fu, “Neural Networks in Computer Intelligence”, McGraw-Hill, Inc. 2012.
2. S N Sivanandam, “Neural Networks using MATLAB 6.0”, TMH, 4th. Reprint 2015.
3. S N Sivanandam, “Principles of Soft Computing”, 2nd. Edition, Wiley, Reprint 2014.

Reference Books:

1. Simon Haykin, “Neural Networks: A Comprehensive Foundations”, Prentice-Hall International, New Jersey, 2013.
2. Freeman J.A. & D.M. Skapura, “Neural Networks: Algorithms, Applications and Programming Techniques”, Addison Wesley, Reading, Mass, 2014.

CSE-412N	Software Testing					
Lecture	**Tutorial**	**Practical**	**Major Test**	**Minor Test**	**Total**	**Time**
4	**0**	**0**	**75**	**25**	**100**	**3 Hrs.**
Purpose	To provide an understanding of concepts and techniques for testing software and assuring its quality.					
Course Outcomes (CO)						
CO1	Expose the criteria and parameters for the generation of test cases.					
CO2	Learn the design of test cases and generating test cases.					
CO3	Be familiar with test management and software testing activities.					
CO4	Be exposed to the significance of software testing in web and Object orient techniques.					

UNIT – I

Introduction: Overview of software evolution, SDLC, Testing Process, Terminologies in Testing: Error, Fault, Failure, Verification, Validation, Difference between Verification and Validation, What is software testing and why it is so hard? Test Cases, Test Oracles,Testing Process, Limitations of Testing.

UNIT - II

Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

Structural Testing: Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing.

UNIT - III

Reducing the number of test cases: Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, and Slice based testing

Testing Activities: Unit Testing, Levels of Testing, Integration Testing, System Testing, Debugging, Domain Testing.

UNIT - IV

Object oriented Testing: Definition, Issues, Class Testing, Object Oriented Integration and System Testing.

Testing Web Applications: What is Web testing?, User interface Testing, Usability Testing, Security Testing, Performance Testing, Database testing, Post Deployment Testing.

Text Books:

1. Naresh Chauhan “Software Testing Principles and Practices” Oxford Publications, 2012.
2. Louise Tamres, “Software Testing”, Pearson Education Asia, 2002.
3. Robert V. Binder, “Testing Object-Oriented Systems-Models, Patterns and Tools”, Addison Wesley, 1999.
4. William Perry, “Effective Methods for Software Testing”, John Wiley & Sons, New York, 1995.

Reference Books:

1. CemKaner, Jack Falk, Nguyen Quoc, “Testing Computer Software”, Second Edition, Van Nostrand Reinhold, New York, 1993.
2. K.K. Aggarwal & Yogesh Singh, “Software Engineering”, 2nd Ed., New Age International Publishers, New Delhi, 2005.
3. Boris Beizer, “Software Testing Techniques”, Second Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.
4. Boris Beizer, “Black-Box Testing – Techniques for Functional Testing of Software and Systems”, John Wiley & Sons Inc., New York, 1995.

5. Gopalaswamy Ramesh, Srinivasan Desikan, Software Testing : Principles and Practices, Pearson India, 2005.

CSE-414N	Graph Theory					
Lecture	**Tutorial**	**Practical**	**Major Test**	**Minor Test**	**Total**	**Time**
4	**0**	**0**	**75**	**25**	**100**	**3Hrs.**
Purpose	**To familiarize the students with the fundamentals of Graph Theory and Graph algorithms.**					
Course Outcomes						
CO1	To get enabled about the various concepts of graph theory.					
CO2	To explore different trees, graphs and algorithms.					
CO3	To deal with the concept of planar graph and its related algorithms.					
CO4	To implement the concept of vectors, colouring, covering and partitioning of a graph.					

UNIT- I

Introduction: Graphs, Isomorphism, Sub graphs, some basic properties, various example of graphs & their sub graphs, walks, path & circuits, connected graphs, disconnected graphs and component, directed graphs, types of directed graphs,Euler graphs, various operation on graphs, Hamiltonian paths and circuits, the traveling sales man problem.

UNIT- II

Trees: Trees and fundamental circuits, distance diameters, radius and pendent vertices, rooted and binary trees, on counting trees, spanning trees, fundamental circuits, finding all spanning trees of a graph and a weighted graph, algorithms of primes, Kruskal and Dijkstra Algorithms.

UNIT- III

Fundamentals of Cut sets: Cut sets Cuts sets and cut vertices, some properties, all cut sets in a graph, fundamental circuits and cut sets, connectivity and separability, network flows.

Planar Graphs: Planer graphs, different representation of a planar graph, combinatorial and geometric dual: Kuratowski graphs, detection of planarity, geometric dual, Discussion on criterion of planarity, thickness and crossings.

UNIT- IV

Vector: Vector space of a graph and vectors, basis vector, cut set vector, circuit vector, circuit and cut set subspaces, Matrix representation of graph – Basic concepts; Incidence matrix, Circuit matrix, Path matrix, Cut-set matrix and Adjacency matrix.

Graph Colouring, covering and partitioning: Colouring, covering and partitioning of a graph, chromatic number, chromatic partitioning, chromatic polynomials, matching, covering, four color problem.

Text Books:

1. Deo, N, Graph theory with applications to Engineering and Computer Science, PHI.
2. Gary Chartrand and Ping Zhang, Introduction to Graph Theory, TMH.

Reference Books:

1. Robin J. Wilson, Introduction to Graph Theory, Pearson Education.
2. Harary, F, Graph Theory, Narosa Publication.
3. Bondy and Murthy: Graph theory and application. Addison Wesley.
4. V. Balakrishnan, Schaum's Outline of Graph Theory, TMH.
5. GeirAgnarsson, Graph Theory: Modeling, Applications and Algorithms, Pearson Education.

CSE-416N	Data Mining					
Lecture	**Tutorial**	**Practical**	**Major Test**	**Minor Test**	**Total**	**Time**
4	**0**	**0**	**75**	**25**	**100**	**3 Hrs.**
Purpose	**To provide the knowledge of data mining and its techniques.**					
Course Outcomes (CO)						
CO1	To learn data mining concepts in details.					
CO2	Expose the criteria for data generalization.					
CO3	To explore knowledge of mining associations, correlations and classification.					
CO4	To evaluate various types of data mining.					

Unit I: Data Mining and Data Preprocessing

Introduction :Data Mining, Functionalities, Data Mining Systems classification, Integration with Data Warehouse System, Data summarization, data cleaning, data integration and transformation, data reduction. Data Warehouse:Need for Data Warehousing, Paradigm Shift, Business Problem Definition, Operational and Information Data Stores, Data Warehouse Definition and Characteristics, Data Warehouse Architecture and Implementation, OLAP.

Unit II: Data Generalization

Data Mining Primitives, Query Language and System Architecture, Concept Description, Data generalization, Analysis of attribute relevance, Mining descriptive statistical measures in large databases, Data deduplication methodologies.

Unit III: Mining Associations and Correlations

Mining association rules in large databases:Association rule mining, Mining single dimensional boolean association rules from transactional databases, mining multilevel association rules from transaction databases, Relational databases and data warehouses, correlation analysis, classification and prediction, Data redundancy detection and elimination techniques.

Unit IV: Cluster Analysis and Mining

Introduction to cluster analysis, Mining complex type of data: Multidimensional analysis and descriptive mining of complex data objects, Spatial databases, Multimedia databases, Mining timeseries and sequence data, Mining text databases, Mining World Wide Web, Data Chunking Techniques.

Text Books

1. J.Han, M.Kamber, Data Mining: Concepts and Techniques, Academic Press, Morgan Kanfman Publishers, 2015.
2. Pieter Adrians, DolfZantinge, Data Mining, Addison Wesley 2013.
3. C.S.R. Prabhu, Data Ware housing: Concepts, Techniques, Products and Applications, Prentice Hall of India, 2014.

Reference Books

1. Berry and Lin off, Mastering Data Mining: The Art and Science of Customer Relationship Management, John Wiley and Sons, 2012.
2. Seidman, Data Mining with Microsoft SQL Server, Prentice Hall of India,2016.

CSE-418N	Parallel Computing					
Lecture	**Tutorial**	**Practical**	**Major Test**	**Minor Test**	**Total**	**Time**
4	**0**	**0**	**75**	**25**	**100**	**3 Hrs.**
Purpose	**To enable students to compare various architectural taxonomies and design paradigms of parallel computers and computational models, parallelism approaches, performance metrics and techniques to parallelize and schedule loops and their programming constructs.**					
Course Outcomes (CO)						
CO1	Classify various synchronous and asynchronous paradigms of parallel computing as well as identify some of the taxonomies for architectural classification of parallel computers.					
CO2	Compare various parallel computation models and approaches and describe different performance metrics in parallel computers.					
CO3	Distinguish shared memory and distributed memory multiprocessors and explainvarious parallel programming models and relative advantages and disadvantages of interconnection networks based on network parameters for reliable connections and achieving efficient speed.					
CO4	Examine various techniques of parallelizing loops and sequential programs and scheduling.					

Unit-I

Introduction: The state of computing, system attributes to performance, Paradigms of parallel computing: Synchronous – Vector/ Array, SIMD, systolic, Asynchronous- MIMD, reduction paradigm.

Hardware Taxonomy: Flynn's classification, Feng's classification, handler's classification. **Software taxonomy**: Kung's taxonomy.

Unit-II

Abstract parallel computational models: combinational circuits, sorting network, PRAM models, VLSI complexity model, Interconnections RAMs, Parallelism approaches- data parallelism, control parallelism, Conditions of parallelism: Data, control and resource dependencies, Hardware and software parallelism.

Performance metrics: Laws governing performance measurements, Metrics- speedups, efficiency, utilization, communication overheads, single/ multiple program performances.

Unit-III

Parallel processors: taxonomy and topology: shared memory multi processors, distributed memory multicomputer, static and dynamic interconnections.

Parallel programming: shared memory programming, distributed memory programming, object orientedprogramming, data parallel programming, functional and data flow programming.

Unit-IV

Scheduling and parallelization: Loop parallelization and pipelining-Loop transformation theory,parallelization and wave fronting, tiling and localization, software pipelining, Scheduling parallel programs, program partitioning and scheduling: Grain size, latency, grain packing and scheduling, loop scheduling, Parallelization of sequential programs.

Text Books

1. Kai Hwang and Naresh Jotwani, Advanced Computer Architecture, Second Edition,McGraw Hill, New Delhi, India, 2012.
2. M.J. Quinn, Parallel Computing: Theory and Practice, Second Edition, McGraw Hill,New Delhi, India, 2008.
3. D.Sima, T.Fountain, P.Kasuk, Advanced Computer Architecture-A Design spaceApproach, Pearson Education,India, 2009.

Reference Books

1. J. L. Hennessy and D. A. Patterson, Computer Architecture: A Quantitative approach, 5th Edition, Morgan Kaufmann/Elsevier-India.
2. T.G.Lewis, Parallel Programming: A machine Independent approach, IEEE Computer Society Press,Los Alamitos, 1994.
3. T.G.Lewis and H. EI-Rewini, Introduction to parallel computing, Prentice Hall, New Jersey, 1998.

CSE-420N	Cloud Computing					
Lecture	**Tutorial**	**Practical**	**Major Test**	**Minor Test**	**Total**	**Time**
4	**0**	**0**	**75**	**25**	**100**	**03 Hrs.**
Purpose	**To familiar the concepts of cloud services and storageto deploy various resources and arbitrary software.**					
Course Outcomes (CO)						
CO1	Facilitate the basic usage and applicability of computing paradigm.					
CO2	Explore various cloud service and deployment models to utilize different cloud services.					
CO3	To get enabled for various data, scalability &cloud services in order to get efficient database for cloud storage.					
CO4	To deal with various security threats and their controlling mechanism for accessing safe cloud services.					

Unit-I

Overview of Computing Paradigm: Recent trends in Computing, Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing, evolution of cloud computing, Business driver for adopting cloud computing.

Cloud Computing (NIST Model), History of Cloud Computing, Cloud service providers, Properties, Characteristics & Disadvantages, Pros and Cons of Cloud Computing, Benefits of Cloud Computing, Cloud computing vs. Cluster computing vs. Grid computing, Role of Open Standards.

Unit-II

Cloud Computing Architecture: Cloud computing stack, Comparison with traditional computing architecture (client/server), Services provided at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web services, Service Models (XaaS) - Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), Deployment Models- Public cloud, Private cloud, Hybrid cloud, Community cloud.

Unit-III

Service Management in Cloud Computing: Service Level Agreements (SLAs), Billing & Accounting, comparing Scaling Hardware: Traditional vs. Cloud, Economics of scaling: Benefitting enormously, Managing Data- Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large Scale Data Processing.

Case study: Eucalyptus, Microsoft Azure, Amazon EC2.

Unit-IV

Cloud Security: Infrastructure Security, Network level security, Host level security, Application level security, Data security and Storage, Data privacy and security Issues, Jurisdictional issues raised by Data location, Identity & Access Management, Access Control, Trust, Reputation, Risk, Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations.

Text Books

1. Barrie Sosinsky, Cloud Computing Bible, Wiley-India, 2010.
2. Rajkumar Buyya,James Broberg, Andrzej M. Goscinski,Cloud Computing: Principles and Paradigms, Wiley, 2011.

Reference Books

1. Nikos Antonopoulos, Lee Gillam, Cloud Computing: Principles, Systems and Applications, Springer, 2012.
2. Ronald L. Krutz, Russell Dean Vines, Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Wiley-India, 2010.

CSE-422N	Natural Language Processing					
Lecture	**Tutorial**	**Practical**	**Major Test**	**Minor Test**	**Total**	**Time**
4	**0**	**0**	**75**	**25**	**100**	**3 Hrs.**
Purpose	To provide the understanding of the mathematical and linguistic foundations underlying approaches to the various areas in NLP.					
Course Outcomes (CO)						
CO1	Be familiar with syntax and semantics in NLP.					
CO2	To implement various concepts of knowledge representation using Prolog.					
CO3	To classify different parsing techniques and understand semantic networks.					
CO4	To identify/explain various applications of NLP.					

Unit-I

Fundamental components of Natural Language Processing: Lexicography,syntax, semantics, prosody, phonology, pragmatic analysis, world knowledge.
Knowledge Representation schemes: Semantic net, Frames, Conceptual Dependency, Scripts.

Unit-II

Representing knowledge using rules: Logic Programming, Introduction to LISP and Prolog, Rules based deduction systems, General concepts in knowledge acquisition.
Syntax Analysis: Formal Languages and grammars, Chomsky Hierarchy, Left- Associative Grammars, ambiguous grammars, resolution of ambiguities.

Unit-III

Computation Linguistics: Recognition and parsing of natural language structures- ATN and RTN, General Techniques of parsing- CKY, Earley and Tomitas algorithm.
Semantics: Knowledge representation, semantics networks logic and inference pragmatics, graph models and optimization.

Unit-IV

Applications of NLP: Intelligent work processor, Machine translation, user interfaces, Man-Machine interfaces, natural language querying, tutoring and authoring systems, speech recognition, commercial use of NLP.

Text Books:

1. Daniel Jurafsky, James H. Martin, “Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition”, 2nd edition, Pearson Edu., 2013.
2. James Allen, “Natural Language Understanding”, Pearson Education, Second Edition, 2003.

Reference Books:

1. Ivan Bratko, “Prolog: Programming for Artificial Intelligence”, 3rd Edition, Pearson Education, Fifth Impression 2009.
2. G. Gazder, “Natural Language processing in prolog”, Addison Wesley, 1989.

CSE-404N	Mobile Apps Development					
Lecture	**Tutorial**	**Practical**	**Major Test**	**Minor Test**	**Total**	**Time**
4	**0**	**0**	**75**	**25**	**100**	**3 Hrs.**
Purpose	**To introduce the concepts of developing the mobile applications.**					
Course Outcomes (CO)						
CO1	Be exposed to technology and Mobile apps development aspects.					
CO2	Be competent with the characterization and architecture of mobile applications.					
CO3	Appreciation of nuances such as native hardware play, location awareness, graphics, and multimedia.					
CO4	Perform testing, signing, packaging and distribution of mobile apps.					

Unit I: Introduction to Mobility

Mobility landscape, Mobile platforms, Mobile apps development, Overview of Android platform, Setting up the Mobile App Development environment along with an Emulator.
App User Interface Designing – Mobile UI resources (Layout, UI elements, Drawable, Menu).

Unit II: Building blocks of Mobile Apps

Activity- States and Life Cycle, Interaction amongst Activities.
App functionality beyond user interface - Threads, Async task, Services – States and Life Cycle, Notifications, Broadcast receivers, Content provider.

Unit III: Sprucing up Mobile Apps

Graphics and animation – Custom views, Canvas, Animation APIs, Multimedia – Audio/Video playback and record, Location awareness.
Native data handling–file I/O, Shared preferences, Mobile databases such as SQLite, and Enterprise data access (via Internet/Intranet).

Unit IV: Testing Mobile Apps

Debugging mobile apps, White box testing, Black box testing, and test automation of Mobile apps, JUnit for Android.

Text Books:

1. Barry Burd, Android Application Development All in one for Dummies, Wiley publications, 2nd Edition 2015.
2. Android Developer Fundamentals Course– Concepts (Learn to develop Android applications) Concepts Reference *Developed by Google Developer Training Team, 2016.*
3. Valentino Lee, Heather Schneider, and Robbie Schell, Mobile Applications: Architecture, Design, and Development, Prentice Hall, 2004.
4. Rick Boyer, Kyle Mew,Android Application Development Cookbook - Second Edition,2016.

Reference Books:

1. Carmen Delessio, Lauren Darcey, Teach Yourself Android Application Development In 24 Hours , SAMS, 2013.
2. Brian Fling, Mobile Design and Development, O'Reilly Media, 2009.
3. Maximiliano Firtman, Programming the Mobile Web, O'Reilly Media, 2010.
4. Christian Crumlish and Erin Malone, Designing Social Interfaces, O'Reilly Media, 2009.
5. Jerome F. DiMarzio, Beginning Android Programming with Android Studio, 4th edition, 2016.
6. Max Lemann ,Android Studio: App Development on Android 6, 2016.

CSE-406N	Mobile Apps Development Lab					
Lecture	**Tutorial**	**Practical**	**Minor Test**	**Practical**	**Total**	**Time**
0	**0**	**2**	**40**	**60**	**100**	**3 Hrs.**
Purpose	Design and Implement various mobile applications using emulators and learn how to Deploy applications to hand-held devices.					
Course Outcomes (CO)						
CO1	Know the components and structure of mobile application development frameworks for Android based mobiles.					
CO2	Understand how to work with various mobile application development frameworks.					
CO3	Learn the basic and important design concepts and issues of development of mobile applications.					
CO4	Understand the capabilities of mobile devices.					

List of Practicals:

1. Develop an application that uses GUI components, Font and Colours
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Implement an application that implements Multi threading
6. Develop a native application that uses GPS location information.
7. Implement an application that writes data to the SD card.
8. Implement an application that creates an alert upon receiving a message.
9. Write a mobile application that creates alarm clock.
10. Develop a sign-in page with appropriate validation.
11. Develop a real life application that makes use of database.

Note: At least 5 to 10 more exercises are to be given by the teacher concerned.

CSE-408N	Computer Hardware & Troubleshooting Lab					
Lecture	**Tutorial**	**Practical**	**Minor Test**	**Practical**	**Total**	**Time**
0	**0**	**2**	**40**	**60**	**100**	**3 Hrs.**
Purpose	**To study the current personal computer hardware including personal computer assembly upgrading, setup configuration and troubleshooting.**					
Course Outcomes (CO)						
CO1	To understand the fundamental hardware components that makes up a computer's hardware and the role of each of these components.					
CO2	Assemble/setup and upgrade personal computer hardware.					
CO3	Perform installation, configuration, and upgrading of microcomputer hardware and software.					
CO4	Diagnose and troubleshoot microcomputer systems hardware and software, and other peripheral equipment.					

List of Practicals:

1. To make the comparative study of various motherboards.
2. To study various cables used in computer communication.
3. To study various connections and ports used in computer communication.
4. To study various cards used in a computer System like Ethernet, sound, video card etc.
5. To study different microprocessor like P-IV, dual core, i3, i5, i7 etc.
6. To study SMPS and UPS.
7. To study rotational and loading mechanisms of the following drives:(Floppy disk drive, Hard disk, CD ROM,CD-R/RW,DVD-ROM, DVD recordable drives, DUAL LAYER DVD-R/W)
8. To study monitor and its circuitry (CRT (Cathode Ray Tube), LCD (Liquid Crystal Display), LED (Light-Emitting Diodes), Plasma (OLED).
9. To study different types of printers and its installation.
10. To study working of keyboard and mouse.
11. To assemble a PC and trouble shooting.
12. To install different Operating System and install different hardware components.

Text Books:

1. How Computers WorkBy, Ron White and Timothy Edward Downs, 10th Revised edition, Pearson Education, 2014.
2. Upgrading and Repairing PCs, Scott Mueller,22nd Edition,Que Publishing, 2015.
3. Learning PC Hardware, Ramesh Bangia, Khanna Book Publishing, 2nd revised edition, 2012.

Reference Book:

1. Pc Hardware: The Complete Reference 1st Edition, Craig Zacker, McGraw Hill Education; 1st edition, 2001.
2. Modern Computer Hardware Course, Manahar Lotia, Pradeep Nair, PayalLotia, BPB Publications, 2nd Revised Edition, 2007.