

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.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO: 1 To provide quality computer education to inculcate modern technical skills among the students.

PEO: 2 To cultivate the ability to analyze the demand of software industry for carrying out hands on projects.

PEO: 3 Inculcate direction qualities to work mutually as a team member with effective briefing skills.

Programme Outcomes

- 1 **Engineering Knowledge:** Apply knowledge of science, computing, mathematics and fundamentals of engineering appropriate for the solution of engineering problems.
- 2 **Problem Analysis:** Analyze and identify the complex problems to formulate and interpret the solutions through the use of research methodology and technical skills to produce meaningful conclusions and recommendations.
- 3 **Design/development of solutions:** Design, develop and implement system components for real world problems which results to new innovations in information technology and related interdisciplinary areas like social, cultural, healthy and secure environment.
- 4 **Conduct investigations of complex problems:** Make use of research skills and basic principles of engineering and technology for various computing and communication system applications through design of experiments, analysis and implementation of algorithms and unification of information.
- 5 **Modern tool usage:** Learn latest hardware and software tools and engineering methodologies to model the complex engineering activities.
- 6 **The engineer and society:** Show the impact of engineering practices on the society for assessing social, cultural, secure, healthy and legal issues to demonstrate the knowledge and needs for sustainable development.
- 7 **Environment and sustainability:** Create an impact of all the engineering solutions in the context of social and environmental issues.
- 8 **Ethics:** Inculcate ethical and moral values in the context of engineering practices.
- 9 **Individual and team work:** Work excellently as a team member and/or leader in distinct fields of engineering using management and engineering principles.
- 10 **Communication:** Communicate effectively the engineering principles to the society and community through written and oral modes such as report writing, presentations, documentation.
- 11 **Project management and finance:** Project completion and cost estimation through management and engineering tools and techniques.
- 12 **Life-long learning:** Understand the need for, and have the preparation and ability to engage in independent and life-long learning.

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 characteristics of 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-412 Software Testing							
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
4	0	0	4	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. Cem Kaner, 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. Gopaldaswamy Ramesh, Srinivasan Desikan, Software Testing : Principles and Practices, Pearson India, 2005.

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-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.