

**PUNYASHLOK AHILYADEVJI HOLKAR
SOLAPUR UNIVERSITY, SOLAPUR**



Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: Computer Science

Name of the Course: M.Sc. II (Sem.–III & IV)

(Syllabus to be implemented w.e.f. June 2021)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

M. Sc. II year (Computer Science)

Syllabus (Semester – III and IV)

(Choice Based Credit System)

With Effect from June 2021

M.Sc. (Computer Science) Part - II Semester-III

Paper Code	Title of the Paper	Hrs / week	Distribution of Marks for Examination			Credits
			Internal	University	Total	
Hard Core - Theory						
HCT 3.1	Digital Image Processing	04	20	80	100	4
HCT 3.2	Open Source Technologies (PHP, MySql)	04	20	80	100	4
Soft Core - Theory (Any One)						
SCT 3.1	Network Security	04	20	80	100	4
SCT 3.2	Cloud Computing					
SCT 3.3	Mobile Computing					
Open Elective - Theory (Any One)						
OET 3.1	Fundamental of Web Designing	04	20	80	100	4
OET 3.2	SWAYAM Course*					
Hard core Lab / Project						
HCP 3.1	Practical based on HCT 3.1	04	10	40	50	2
HCP 3.2	Practical based on HCT 3.2	04	10	40	50	2
HCP 3.3	Project – III	02	10	40	50	2
Open Elective (Any One)						
OEP 3.1	Practical Based on OET 3.1	04	10	40	50	2
OEP 3.2	Practical / Seminar / Viva based on SWAYAM course OET 3.2					
Others	Tutorial	02	25	-	25	1
Total of Sem. III		32	145	480	625	25
Add on Skill Course : Website Design using WordPress		Theory : 50 marks, Practical : 50 marks				4

Part - II Semester-IV

Paper Code	Title of the Paper	Hrs / week	Distribution of Marks for Examination			Credits
			Internal	University	Total	
Hard Core - Theory						
HCT 4.1	•Net Technology	04	20	80	100	4
HCT 4.2	Machine Learning	04	20	80	100	4
HCT 4.3	Data Warehouse and Mining	04	20	80	100	4
Soft Core - Theory (Any One)						
SCT 4.1	Soft Computing	04	20	80	100	4
SCT 4.2	Block chain Technology					
Hard core Lab / Project						
HCP 4.1	Practical based on HCT 4.1	04	10	40	50	2
HCP 4.2	Practical based on HCT 4.2	04	10	40	50	2
HCP 4.3	Practical based on HCT 4.3	04	10	40	50	2
HCP 4.4	Project – IV	02	10	40	50	2
Others	Tutorial	02	25	-	25	1
Total of Sem. IV		32	145	480	625	25

*: The credits will be transferred as per university policy and UGC guidelines after submitting the completion certificate / mark list from the SWAYAM.

Code: HCT 3.1

Course Title: Digital Image Processing

Total Lectures: 60 Hrs

University Evaluation: 80 Marks

Contact Hrs (L) 4

Internal Evaluation: 20 Marks

Course Objective: Processing color and grayscale images or other two-dimensional signals has become an important tool for research and investigation in many areas of science and engineering. Digital Image Processing is designed to give students a powerful collection of fundamental and advanced image processing tools on the desktop.

Unit – I Introduction:

Digital image processing, Applications of digital image processing, Fundamental steps in digital image processing, and Components of an image processing system. [05]

Digital image fundamentals:Image sampling and quantization, some basic relationships between pixels, Linear and nonlinear operation. [05]

Image enhancement in the spatial domain:Some basic gray level transformations, Histogram processing, Enhancement using arithmetic/logic operations, Basics of spatial filtering, Smoothing spatial filters, Sharpening spatial filters. [05]

Unit – II Image enhancement in the frequency domain:

Introduction to the Fourier transform and the frequency domain, Smoothing frequency- domain filters, Sharpening frequency domain filters, homomorphic filtering. [07]

Image restoration:A model of the image degradation/restoration process, Noise models, Restoration in the presence of noise only-spatial filtering, Periodic noise reduction by frequency domain filtering. [08]

Unit – III Morphological image processing:

Preliminaries, Dilation and erosion, Opening and closing, the hit-or-miss transformation, Some basic morphological algorithms. [07]

Image segmentation: Detection of discontinuities, Edge linking and boundary detection, Thresholding, Region-based segmentation, Segmentation by morphological watersheds. [08]

Unit – IV Representation and description:

Representation, Boundary descriptors, Regional descriptors, Use of principal components for description,Relational descriptors. [07]

Object recognition:Patterns and pattern classes, Recognition based on decision- theoretic methods,Structural methods.[08]

Reference books:

1. Digital image processing: Gonzalez and Woods PHI
2. Image Processing, Analysis and Machine Vision: Milan Sonka, Vaclav Hlavac, Roger Boyle (Thomson Brooks / Cole Edition).
3. Fundamentals of Digital Image Processing: Anil K. Jain (Prentice Edition Hall of India).

Course Code: HCT 3.2

Course Title: Open Source Technologies (PHP, MySql)

Total Lectures: 60 Hrs

University Evaluation: 80 Marks

Contact Hrs (L) 4

Internal Evaluation: 20 Marks

Course Objective: This course is aimed to provide a fundamental understanding of dynamic web site creation. PHP is the language used for development of most common web sites. Syllabus includes basic and advanced features of PHP which includes detailed introduction of PHP and MYSQL, Arrays, Loops and variables etc. It also gives an overview open source framework like JOOMLA, ZEND etc.

Unit - I

Introduction to Open Source and PHP programming Introduction to Open Sources Technologies, Introduction to PHP, installation and configuration, Advantages and Disadvantages of PHP, Client Side Scripting, Server Side Scripting, Variables, data types, various types of function, creating your own function, Strings in PHP, String Functions. [10]

Unit - II

Operator, Loops, Array, Exception and Error Handling Operators, Conditions, Loops, Using for each, Creating and Using Arrays, Multidimensional Array, Associative array. Error Handling in PHP, Errors and Exceptions, Exception class, try/catch block, throwing an exception, defining your own Exception subclass. [15]

Unit - III

Classes, File system, Passing Information between pages Object oriented programming with Php, Working with Datetime, code re-use, require (), include(), and the includepath; Understanding PHP file permissions, File reading and writing functions, File system functions, File uploads, Sending mail & use of email server. HTTP, GET arguments, POST arguments, Using Session in PHP, cookies, The setcookie() function, Deleting Cookies and Reading Cookies. [15]

Unit - IV

Working with database HTML Tables and Database tables, Database manipulation(Select, Insert, Update, Delete), validating User Input using Java script. MYSQL, Introducing MySQL; database design concepts; the Structured Query, Language (SQL); communicating with a MySQL back end via the PHP, MySQL API Building Database Applications, Module V: Working with Frameworks Working with Mambo, Working with Joomla, Working with framework. Use of Joomla in rapid development of website. Developing of simple website using joomla. [20]

References:

1. The Complete Reference PHP, by Steven Holzner, TAYA McGraw-Hill Publication
2. Beginning PHP and MYSQL, by W. Jason Gilmore, Apress Publication
3. Beginning PHP, Apache, MySQL Web Development, Michael K. Glass, Yann Le Scouarnec, Elizabeth Naramore, Gary Mailer, Jeremy Stolz, Jason Gerner

Course Code: SCT 3.1

Course Title: Network Security

Total Lectures: 60 Hrs

University Evaluation: 80 Marks

Contact Hrs (L) 4

Internal Evaluation: 20 Marks

Course Objective: The objective here is to acquaint the students with the application of networking. Detail description of the various protocols and the working of security policy and its performance, Network security and authentication, and various algorithms related to it has been dealt, to get a practical approach.

Unit – I

Introduction: Security Concepts, Threats and Risks, Attacks – Passive and Active Security Services, Confidentiality, Authentication, Non-Repudiation, Integrity, Access Control, Availability, Model for Internet work Security, Internet Standards and RFCs. [08]

Access Control Mechanisms: Access Matrix, HRU, TAM, ACL and capabilities, Access Control Models, Chinese Wall, Clark-Wilson, Bell- LaPadula, Non-Interference and Role Base Model. [07]

Unit – II

Cryptography: Secret Key and Public Key Cryptosystems, Symmetric Ciphers, Block Ciphers and Stream Ciphers, DES, IDEA and Key Escrow, RSA and ElGamal, Secure Hash and Key management, Digital Signature and Non-repudiation, cryptanalysis [15]

Unit – III

Network Security: Objectives and Architectures, Internet Security Protocols, IP encapsulating Security Protocol, Network and Transport Layer Security. [07]

Network Security Applications: Authentication Mechanisms – Passwords, Cryptographic authentication protocols, Smart Card, Biometrics, Digital Signatures and seals, Kerberos, X.509 LDAP Directory. Web Security - SSL Encryption, TLS, SET, E-mail Security, PGP / MIME, IP Security. [08]

Unit – IV

Access and System Security: Intruders, Intrusion Detection and Prevention. Firewalls - Hardware Firewall, Software Firewall, Application Firewall, Packet Filtering, Packet Analysis. Proxy Servers - Firewall setting in Proxy, ACL in Proxy [15]

Reference Books:

1. Network Security Essentials: William Stallings, Prentice-Hall.
2. Fundamentals of Computer Security Technology: Edward Amoroso, Prentice-Hall.
3. Cryptography and Data Security: Dorothy E. Denning, Addison-Wesley.
4. Computers under Attack: Peter J. Denning, Addison-Wesley.
5. Cryptography - Theory and Practice: Douglas R. Stinson, CRC Press.
6. Building Internet Firewalls: D. Brent Chapman and Elizabeth D. Zwicky, O'Reilly and Associates.

Course Code: SCT 3.2

Course Title: Cloud Computing

Total Lectures: 60 Hrs

University Evaluation: 80 Marks

Contact Hrs (L) 4

Internal Evaluation: 20 Marks

Course Objective: The course presents a top-down view of cloud computing, from applications and administration to programming and infrastructure. The topic introduces students with various concepts like cloud systems, parallel processing in the cloud, distributed storage systems, virtualization, security in the cloud, and multi-core operating systems. Students will study state-of-the-art solutions for cloud computing developed by Google, Amazon, Microsoft etc.

Unit – I

Introduction to Cloud Computing What is a cloud, Definition of Cloud Computing, Characteristics of Cloud Computing, Driving factors towards cloud, Architecture, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web services, Service Models: IaaS, PaaS, SaaS, NaaS, Cloud Clients, Deployment Models: Public Clouds, Community Clouds, Hybrid Cloud, Private Cloud, Issues in Cloud Computing, Applications. [10]

Unit – II

Infrastructure as a Service(IaaS) IaaS definition, Introduction to virtualization, Different approaches to virtualization, Resource Virtualization- Server, Storage, Network, Hypervisors, Machine Image, Virtual Machine(VM), Data storage in cloud computing(storage as a service), Examples like Amazon EC2-Renting, EC2 Compute Unit, Platform and Storage, pricing, customers. [15]

Unit – III

Platform as a Service(PaaS) What is PaaS, Service Oriented Architecture (SOA), Cloud Platform and Management, Examples like Google App Engine. Module IV: Software as a Service(SaaS) Introduction to SaaS, Web services, Web 2.0 [20]

Unit – IV

Overview of Security Issues, Infrastructure Security: Network level security, Host level security, Application level security, Data security and Storage, Challenges and Risks of Cloud Computing Platforms and Cloud Services. [15]

Reference Books:

1. Raj Kumar Buyya, James Broberg, Andrezei M.Goscinski, Cloud Computing: Principles and paradigms, 2011
2. Michael Miller, Cloud Computing, 2008
3. Cloud Computing, A Practical Approach By Toby Velte, Anthony Velte, Robert C. Elsenpeter, 2009

Course Code: SCT 3.3

Course Title: Mobile Computing

Total Lectures: 60 Hrs

Contact Hrs (L) 4 University

Evaluation: 80 Marks

Internal Evaluation: 20 Marks

Course Objective: The objective of this consortium is to shape and expand a full-scale and sound mobile computing system market. To achieve this, cooperation is required of interests related to communication (network), computer hardware/software, system integrator (including service providers), and the media.

Unit – I

Introduction to Personal Communications Services (PCS) PCS Architecture, Mobility management, Networks signaling. Global System for Mobile Communication (GSM) system overview: GSM Architecture, Mobility management, Network signaling. [10]

Unit – II

General Packet Radio Services (GPRS) & Wireless Application Protocol (WAP) GPRS Architecture, GPRS Network Nodes. Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP. Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML). [15]

Unit – III

Third Generation (3G) Mobile Services Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G. Wireless Local Loop(WLL): Introduction to WLL Architecture, wireless Local Loop Technologies. [15]

Unit – IV

Global Mobile Satellite Systems Global Mobile Satellite Systems; case studies of the IRIDIUM and GLOBALSTAR systems. Module V: Enterprise Networks Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols. Advanced techniques in mobile computing. [20]

Reference Books:

1. “Wireless and Mobile Networks Architectures”, by Yi-Bing Lin & Imrich Chlamtac, John Wiley & Sons, 2001.
2. “Mobile and Personal Communication systems and services”, by Raj Pandya, Prentice Hall of India, 2001.
3. “Guide to Designing and Implementing wireless LANs”, by Mark Ciampa, Thomson learning, Vikas Publishing House, 2001.
4. “Wireless Web Development”, Ray Rischpater, Springer Publishing, 2000.

Course Code: OET 3.1

Course Title: Fundamental of Web Designing

Total Lectures: 60 Hrs

Contact Hrs (L) 4

University Evaluation: 80 Marks

Internal Evaluation: 20 Marks

Unit – I

Web Design Principles: Basic principles involved in developing a web site, planning process, Five Golden rules of web, designing, Designing navigation bar, Page design, Home Page Layout, Design Concept. Basics in Web Design: Brief History of Internet, What is World Wide Web, Why create a web site, Web Standards. [15]

Unit – II

Introduction to HTML: What is HTML, HTML Documents, Basic structure of an HTML document, creating an HTML document, Mark up Tags, HeadingParagraphs, Line Breaks, and HTML Tags. [15]

Unit – III

Elements of HTML: Introduction to elements of HTML, Working with Text, Working with Lists, Tables and Frames, Working with Hyperlinks, Images and Multimedia, Working with Forms and controls. [15]

Unit – IV

Introduction to Google Applications: What is Google Forms, components of form design, Google Docs, Google Sheets, Google Slides, Google Drive, Gmail, and Google Search. What is Google Site, Use of template, theme, to design sites, components of Google Site, edit pages in Google Site, practice of menus- Insert, Format, Table, Layout etc. Use and design of Google Classroom, Google Translator. [15]

Reference Books:

1. HTML, XHTML and CSS Bible (5th Edn.): Steven M. Schafer, Wiley India.
2. Beginning HTML, XHTML, CSS and JavaScript: John Duckett, Wiley India.
3. My Google Apps (2nd Edn.): Patrice-Anne Rutledge, Sherry Kinkoph Gunter.
4. The Teacher's Guide to Google Classroom eBook: Kasey Bell, Kindle Edition.
5. Google Apps Meets Common Core (1st Edition) by Michael J. Graham 6. Google Apps Script: Web Application Development Essentials (2nd Edition): James Ferreira.

Course Code: OET 3.2,
Course Title: SWAYAM MOOCs Course

1. Student has to register one course of minimum 4 credits from SWAYAM
2. The selected course should not be from the syllabus. 3. After registration student has to report to the SWAYAM mentor of the dept.
3. Student should register for the online exam of the same course, pass the exam. and submit the Mark list / certificate from SWAYAM to the mentor.
4. OEP 3.2 Practical / Seminar / Viva based on SWAYAM course OET 3.2

Course Code: HCP 3.1,
Course Title: Practical based on HCT-3.1

Minimum 20 Practical Assignments based on HCT 3.1.

Course Code: HCP 3.2,
Course Title: Practical based on HCT-3.2

Minimum 20 Practical Assignments based on HCT3.2.

Course Code: HCP 3.3,
Course Title: Project III

Real time and live project followed by Presentation/Viva-Voce.

Course Code: OEP 3.1, Course Title: Practical Based on OET 3.1

Minimum 15 Practical Assignments based on OET3.1.

Code: HCT 4.1

Course Title: .Net Technology

Total Lectures: 60 Hrs

University Evaluation: 80 Marks

Contact Hrs (L) 4

Internal Evaluation: 20 Marks

Course Objective: To create web based applications using ASP.NET.

Unit – I Microsoft .NET framework:

Structure, the common language runtime, JIT,CTS,Metadata. [05]

C#: Introduction to C#, Programming structure of C#, editing, compiling & executing C# programs, namespace, comments, using aliases for namespace classes, using command line argument, math functions, scope of variables, boxing & unboxing, file operations, indexes, delegates, events,preprocessor,attributes [10]

Unit – II Advanced concepts in C#:

Creating winform applications, COMinteroperability, using COM / COM+, reflection, components in C#, Handling databases using ADO.net. [09]

Introduction to ASP.Net:Introduction, difference between ASP & ASP.Net Application, Web Architecture Model, Introduction to Visual Studio forWebApplication. [06]

Unit – III Application and Page Frameworks:

Application Location Options, The ASP.NET Page Life Cycle, The ASP.NET Page Structure Options, ASP.NET Page Directives, ASP.NET Page Events, Dealing with PostBacks, ASP.NET ApplicationFolders,Global.asax [07]

ASP.NET Server Controls and Validation Controls: ASP.Net Server Controls,Understanding Validation, Client-Side versus Server-Side Validation, Turning OffClient-Side Validation. [08]

Unit – IV Working with Master Pages:

Need and basics of Master Pages, Master Page and Content Page, Programmatically Assigning the Master Page, Nesting Master Pages, MasterPageEvents. [07]

ASP.Net State Management:Application State, Session State, Client & server storing, View state, Cache, Hidden Variable, Session object, Profiles, Overview of HTTP Handler&Modules. [08]

References books:

1. MicrosoftVisual C#.NET Step-By-Step Version 2003:Sharp,Jagger, Publisher: Microsoft Press
2. Programming in C#: E. Balagurusamy,TMH
3. C# a beginners guide: Herbert Schildt,TMH
4. Professional ASP.NET 2.0: Bill Evjen, Scott Hanselman, Farhan Muhammed, Sirnivasa Sivakumar, Devin Rader, Wrox Publication.
5. MS ASP.NET 2.0 Step by Step: George Shepherd, Microsoft Press.

Code: HCT 4.2

Course Title: Machine Learning

Total Lectures: 60 Hrs

Contact Hrs (L) 4

University Evaluation: 80 Marks

Internal Evaluation: 20 Marks

Course Objective: The course is spearhead for Machine Learning models and uncover hidden insights to problems that were once thought impossible. Student could become a leader in the ML & AI by learning about its breakthroughs achieved and future that it holds. The student could gain solid awareness of the key concepts of AI, ML, Deep Learning, Data Mining & Data Science. Make strategically important decisions in students professional domain with ML techniques, models, and various algorithms Leverage your innovative ability to develop intelligent ML & AI-based solutions using the required platforms and languages.

Unit I

Introduction- Machine Learning Definitions, Artificial Intelligence Definitions, Machine Learning vs AI Machine Learning vs Deep Learning, Most Common ML Algorithms, Types of Machine Learning Supervised Unsupervised Reinforcement, General Steps or Process of Machine Learning, Data cleaning, data transform/fitting Overfitting, Under fitting, Variance, Bias, Required Maths- Linear Algebra - In Numpy, Probability, Stats, Calculus (Derivates), Tool Kit, Python Basics, Python Advance, Numpy, Pandas, Matplotlib, Scikit-learn or sklearn Library. [15]

Unit II

Supervised Learning, Classification, Random Forest, Decision Trees, Logistic Regression, Support Vector Machines, KNN, Naïve Bayes, Usage, Regression, Linear Regression, Regularization Techniques (LASSO), Polynomial Regression, Usage, Case Study (Classification). [15]

Unit III

Unsupervised Learning, Clustering, K-Means, K Nearest Neighbours, Association Rule Learning, Dimensionality Reduction, PCA, SVD, tSNE, Case Study (Clustering/Anomaly/Fraud Detection). [15]

Unit IV

Reinforcement Learning, Markov Decision Monte Carlo Prediction, Case Study (next best offer, dynamic pricing), Natural Language Processing, Text Mining Generation, Case Study (Generation) Predictive Analytics – Forecasting, Logistic, Time Series (ARIMA), Case Study (Time Series), Ensemble Techniques Boosting, Bagging, Machine Learning Applications across Industries- Healthcare, Retail, Financial Services, Manufacturing, Hospitality [15]

References books:

1. Introduction to Machine Learning, 2nd Edition, by Ethem Alpaydin.
2. Machine Learning, Tom Mitchell, First Edition, McGraw Hill, 1997.
3. C. Bishop, Pattern Recognition and Machine Learning. Berlin: Springer-Verlag, 2006.

Code: HCT 4.2

Course Title: Data Warehouse and Mining

Total Lectures: 60 Hrs

Evaluation: 80 Marks

Contact Hrs (L) 4 University

Internal Evaluation: 20 Marks

Course Objective: To introduce students to basic applications, concepts, and techniques of data mining. To develop skills for using recent data mining software to solve practical problems in a variety of disciplines. To gain experience doing independent study and research.

Unit-I

Introduction: What is Data Warehouse? A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Data cube Technology, From Data Warehousing to Data Mining, Data Mining Functionalities, Data Cleaning, Data Integration and Transformation, Data Reduction. [07]

Data Mining Primitives, Languages, and System Architectures: Data Mining Primitives, Presentation and Visualization of discovered patterns, A Data Mining Query Language. [08]

Unit – II

Mining Association Rules in Large Databases Translation: Association Rule Mining Single-Dimensional Boolean, Association Rules from Transactional Databases, Mining Multilevel Association Rules From Transactional Databases. [15]

Unit – III

Classification and Predication: Issues regarding Classification and Predication, Classification by Decision tree induction, Bayesian Classification, Classification by Back propagation, Classification Based on the concepts from association rule mining, Other classification methods, Prediction. [15]

Unit – IV

Clustering: What is Cluster Analysis? Types of data in Cluster Analysis, A Categorization of Major Clustering Methods. Partitioning Methods, Hierarchical Methods, Density-Based Methods, Model-Based Clustering Methods: Statistical Approach, Neural Network Approach, Outlier Analysis. [08]
Applications and Trends in Data Mining: Data Mining Applications, Data Mining System Products and Research Prototypes, Additional Themes on Data Mining, Data Mining and Intelligent Query Answering, Trends in Data Mining. [07]

Reference Books:

1. Data Mining Concepts and Techniques: Jiawei Han and Micheline Kamber, Morgan Kauf Mann Publishers.
2. Modern Data Warehousing, Mining and Visualization: George M. Marakas, Pearson Education, 2003.
3. Building the Data Warehouse: W. H. Inmon, Wiley Dreamtech, Third Edition.

Code: SCT 4.1

Course Title: Soft Computing

Total Lectures: 60 Hrs

Evaluation: 80 Marks

Contact Hrs (L) 4 University

Internal Evaluation: 20 Marks

Course Objective: To develop the skills to gain a basic understanding of neural network theory and fuzzy logic theory. To introduce students to artificial neural networks and fuzzy theory from an engineering perspective

Unit – I

Fundamentals of Neural Networks: Basic concepts, models of artificial neuron, neural network architectures, characteristics, learning methods. [06]

Backpropagation networks: Architecture, backpropagation learning: input, hidden and output layer computation, error calculation, training of neural network, method of steepest descent, effect of learning rate, back propagation algorithm. [09]

Unit – II

Crisp Sets: an Overview, Fuzzy Sets: Basic Types, Basic Concepts, Fuzzy Sets Vs Crisp Sets, Additional Properties of alpha cuts, Presentation of fuzzy sets, Extension principle for fuzzy sets. [15]

Unit – III

Operations on Fuzzy Sets: Types of operations, Fuzzy complements, Fuzzy Intersections, Fuzzy Unions, Crisp and Fuzzy Relation, Binary Fuzzy Relations, Binary Relation on single set, Fuzzy Equivalence Relations, Fuzzy Compatibility Relation. [15]

Unit – IV

Basic concepts, working principle, Genetic representations, Encoding: binary, octal, hexadecimal encoding, permutation encoding, value encoding, tree encoding, Fitness function, Reproduction: Roulette-wheel selection, Tournament selection, Rank selection, Mutation operator, Generational Cycle, applications.

[15]

Reference books:

1. Neural Networks, Fuzzy Logic and Genetic Algorithms: S. Rajasekaran, G. A. Vijayalakshmi Pai, PHI.
2. Fuzzy Sets and Fuzzy Logic Theory and Application: George J. Klir, Bo Yuan, PHI.
3. Fuzzy Sets Uncertainty and Information: George J. Klir, Tina A. Floger, PHI.
4. Introduction to the Theory of Neural Competition John hertz, Krogh and Richard, Addison Wesley.
5. Introduction to Artificial Neural Network: Jaeck M. Zurada, Jaico Publishing House. 6. Neural Network and Fuzzy System A Dynamic System: Koska, PHI.

Code: SCT 4.1

Course Title: Block Chain Technology

Total Lectures: 60 Hrs

Evaluation: 80 Marks

Contact Hrs (L) 4 University

Internal Evaluation: 20 Marks

Course Objective: To understand fundamentals of blockchain technology. To understand how blockchain systems (mainly Bitcoin and Ethereum) work. To impart strong understanding of Blockchain technologies. To introduce application areas, current practices, and research activity. To integrate ideas from blockchain technology into their own projects.

Unit I

Introduction Need for Distributed Record Keeping Modeling faults and adversaries Byzantine Generals problem Consensus algorithms and their scalability problems Why Nakamoto Came up with Blockchain based cryptocurrency? Technologies Borrowed in Blockchain – hash pointers, consensus, byzantine fault-tolerant distributed computing, digital cash etc, Basic Distributed Computing Atomic Broadcast, Consensus, Byzantine Models of fault tolerance. [15]

Unit II

Basic Crypto primitives Hash functions, Puzzle friendly Hash, Collision resistant hash, digital signatures, public key crypto, verifiable random functions, Zero-knowledge systems. [7]

Blockchain 1.0 Bitcoin blockchain, the challenges, and solutions, proof of work, Proof of stake, alternatives to Bitcoin consensus, Bitcoin scripting language and their use [8]

Unit III

Blockchain 2.0 Ethereum and Smart Contracts, The Turing Completeness of Smart Contract Languages and verification challenges, Using smart contracts to enforce legal contracts, comparing Bitcoin scripting vs. Ethereum Smart Contracts. [10]

Blockchain 3.0 Hyperledger fabric, the plug and play platform and mechanisms in permissioned blockchain [5]

Unit IV

Privacy, Security issues in Blockchain Pseudo-anonymity vs. anonymity, Zcash and Zk-SNARKS for anonymity preservation, attacks on Blockchains – such as Sybil attacks, selfish mining, 51% attacks - - advent of algorand, and Sharding based consensus algorithms. [15]

Reference books:

1. Josh Thompson, 'Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming', Create Space Independent Publishing Platform, 2017.
2. Mastering Blockchain, Second Edition Distributed ledger technology, decentralization, and smart contracts explained, Packt- BIRMINGHAM – MUMBAI.

Course Code: HCP 4.1,

Course Title: Practical based on HCT-4.1

Minimum 20 Practical Assignments based on HCT 4.1.

Course Code: HCP 4.2,

Course Title: Practical based on HCT-4.2

Minimum 20 Practical Assignments based on HCT 4.2.

Course Code: HCP 4.3,

Course Title: Practical based on HCT-4.3

Minimum 20 Practical Assignments based on HCT 4.3.

Course Code: HCP 4.4,

Course Title: Project IV

Real time and live project followed by Presentation/Viva-Voce.

Add on Skill Course

Website Design using WordPress

Aim : To develop the skill and knowledge of web page design

Objectives : The student will be able to

- Define the principle of web page design
- Define basics in web design
- Visualize the basic concept of HTML, CSS and Wordpress
- Develop the concept of web publishing

Unit – I	15 Hrs.
Web Design Principles: Basic principles involved in developing a web site, planning process, Five Golden rules of web, designing, Designing navigation bar, Page design, Home Page Layout, Design Concept.	
Basics in Web Design: Brief History of Internet, What is World Wide Web, Why create a web site, Web Standards.	
Unit – II	15 Hrs.
Introduction to HTML : Introduction to HTML: What is HTML , HTML Documents , Basic structure of an HTML document, Creating an HTML document ,Mark up Tags ,Heading-Paragraphs , Line Breaks, HTML Tag Elements of HTML: Introduction to elements of HTML , Working with Text , Working with Lists, Tables and Frames ,Working with Hyperlinks, Adding Images, Working with Forms and controls, Embedded Media: Formatting and Fonts, Commenting Code, Color, Hyperlink, Lists, Tables, Images, Forms, Meta Tags, Character Entities, Frames and Frame Sets, Browser Architecture and Web Site Structure, use of HTML WYSIWYG Editor.	
Cascading Style Sheet: Introduction to CSS, Types of style sheets, Text formatting properties, CSS Borders, Margin Properties, Color properties, Use of and tag, Use of classes in CSS with an example.	
Website Planning and Deployment	
Introduction to Web, Web Designing and Website Planning: Concept of WWW, Internet and WWW, HTTP Protocol: Request and Response, Web Browser and Web Servers, Website Hosting-Free vs. Paid, Linux Vs. Windows Hosting, Concepts & use of Database & Mail Servers Decide which type of website you are building Types of website, Types of Hosting, Domain name (your custom web address) Web-site hosting (service that hosts your website) Register a Domain and Sign Up for Web Hosting Account, Website Hosting Issues.	
Unit – III	15 Hrs
Creating a WordPress Site (Installing WordPress) : Installing WordPress with a Web Host’s “1-Click Install”, Manually Installing WordPress	
Logging Into the WordPress Admin & General Site Settings : Logging Into the WordPress Admin, General WordPress Settings, Editing Your Profile, Setting Your Profile Picture (Gravatar)	
Writing Posts & Formatting Text : Posts versus Pages, Creating a New Blog Post, Using the Visual Editor, Pasting Without Formatting & Clearing Formatting, Formatting Headings, Formatting Bulleted & Numbered Lists, Formatting Blockquotes, Publishing a Post, Deleting a Post, Restoring a Post from the Trash (or Deleting it Delete Permanently)	

Unit – IV**15 Hrs**

Publishing a Post (Making it Live) : Publishing a Post (Making it Live), Status, Visibility, Publish Date & Time,

Adding a Read More Link to a Post : Adding the Read More Tag, Changing the Text in the More Tag

Creating Links (Hyperlinks) : Linking to Another Website, Opening a Link in a New Tab

Linking to a Page Within Your Site, Editing & Removing Links

Adding Images & Managing the Media Library : Adding an Image to a Post or Page, Editing Images (Manually Resizing, Cropping, & Rotating), Media Settings (Customizing the Size of Thumbnail, Medium, & Large), Adding a Featured Image, Uploading Images & Files Directly Into the Media Library, Editing & Deleting Images in the Media Library, Deleting Unused Images (Cleaning Out the Media Library)

Adding an Image Gallery : Adding an Image Gallery, Editing an Existing Image Gallery

Adding Video : Embedding Responsive Videos, Uploading a Video File

Reference Books –

- HTML, XHTML and CSS Bible (5th Edn.): Steven M. Schafer, Wiley India.
- Beginning HTML, XHTML, CSS and JavaScript: John Duckett, Wiley India.
- My Google Apps (2nd Edn.): Patrice-Anne Rutledge, Sherry Kinkoph Gunter.
- The Teacher's Guide to Google Classroom eBook: Kasey Bell, Kindle Edition.
- Professional WordPress: Design and Development 2nd Edition : by Brad Williams, David Damstra, Hal Stern
- WordPress For Dummies 7th Edition, Kindle Edition : by Lisa Sabin-Wilson
- WordPress To Go by Sarah McHarry (Format: Kindle Edition)