B.Tech. CSE Sem – V [July-December 2020]
(CSE-Core/CSE-IOT/CSE-AI/CSE-CTIS/CSE-DS)

Sr. No.	Course Code	Courses	L	T	P	Credit
1	CS3CO24	Computer Graphics & Multimedia	3	1	2	5
2	CS3CO26	Software Engineering	3	1	2	5
3	CS3CO12	Computer Networks	3	1	2	5
4	OE000XX	Open Elective-1	3	0	0	3
5	CS3ELXX	Elective-2	3	0	0	3
6	EN3MC15	Universal Human Values and Professional Ethics	2	0	0	0
7	EN3MC10	Soft Skills-III	2	0	0	0
8	CS3ES13	Software Worshop-II	0	0	2	1
		Total	**19**	**3**	**8**	**22**
		Total Contact Hours	**30**			

Elective-2: *(Choose any one)*
[Track: Web Technology] & [Track: Data Engineering]: Cloud Computing (CS3EL10)
[Track: AI]: Machine Learning (CS3EA07)
[Track: CTIS]: Cryptography (CS3EY02)
[Track: Data Science]: Statistical Inference (CS3ET02)

Open Elective-1(CSE Core): (*Choose any one)*

Agile Development (OE00015)/ Blockchain Architecture (OE00016) / Python Essentials (OE00018)

Open Elective-1(CSE-CTIS):

Server Administration (OE00071)

Open Elective-1(CSE-DS):

Introduction to Data Science (OE00072)

Course Code	Course Name	Hours per Week			Total
		L	T	P	Credit
CS3CO24	Computer Graphics & Multimedia	3	1	2	5

Unit-I

Introduction to Raster Scan Displays, Pixels, Frame Buffer, Vector & Character Generation, Random Scan Systems, Display Devices, Scan Conversion Techniques, Line Drawing: Simple DDA, Bresenham's Algorithm, Circle Drawing Algorithms: Midpoint Circle Drawing and Bresenham's Algorithm, Polygon Fill Algorithm: Boundary-Fill and Flood-Fill Algorithms.

Unit-II

2-D Transformation: Translation, Rotation, Scaling, Shearing, Reflection. Inverse Transformation, Homogenous Coordinate System, Matrices Transformation, Composite Transformation. Windowing & Clipping: World Coordinate System, Screen Coordinate System, Viewing Transformation, Line Clipping & Polygon Clipping Algorithms.

Unit-III

3-D Transformations: Translation, Rotation and Scaling. Parallel & Perspective Projection: Types of Parallel & Perspective Projection, Hidden Surface Elimination: Depth Comparison, Back Face Detection Algorithm, Painter's Algorithm, and Z-Buffer Algorithm.

Unit-IV

Curve Generation, Bezier and B-spline Methods. Basic Illumination Model: Diffuse Reflection, Specular Reflection, Phong Shading, Gouraud Shading, Ray Tracing, Color Models like RGB, YIQ, CMY, HSV.

Unit V

Multimedia: Characteristics of a Multimedia Presentation, Multimedia Architecture, Text –Types, Unicode Standard, Text File Formats, Audio- Components of an Audio System, Digital Audio, Digital Audio Processing, Audio File Formats, Video- Digital Video, Digital Video Processing, Video File Formats.

Animation: Uses of Animation, Principles of Animation, 3D Animation, Animation File Formats, Animation Software, MPEG Standards.

Text Book

1. Donald Hearn and M.P. Becker Computer Graphics Pearson Pub.
2. Vaughan, Tay. *Multimedia: Making it work*. Tata McGraw-Hill Education.

References

1. Parekh, Principles of Multimedia, Tata McGraw Hill.
2. Rogers, "Procedural Elements of Computer Graphics", Tata McGraw Hill.
3. Maurya, Computer Graphics with Virtual Reality System, Wiley India.

Course Code	Course Name	Hours Per Week			
		L	T	P	Credits
CS3CO26	Software Engineering	3	1	2	5

Unit I

Software Engineering – Definition, Process, Evolution and Myths, Generic Process Model, Framework, Process Models – Waterfall, Incremental, Evolutionary, Spiral, Component Based Model, Rational Unified Process

Unit II

Requirement Analysis, Stakeholders, Elicitation Techniques, Requirement Modelling - Use Cases, Activity Diagrams, Swimlane Diagrams, Data Modelling, Data Flow Diagram, Overview of Class Based Modelling, requirement Tracking

Unit III

Principles of Software Design, Design Concepts – Abstraction, Architecture, Modularity, Relationships, Design Model, Component Design, User Interface Design, Configuration Management

Unit IV

Software Quality, Approaches for Quality Assurance, Software Testing, Verification and Validation, Types of Testing, Risk Assessment, Risk Mitigation, Monitoring and Management

Unit V

Software Metrics, Process Metrics, Product Metrics, Function Oriented Metrics, Software Project Estimations, Function Point Based Metrics, COCOMO Models, Project Scheduling, Effort Distribution

Text Book:

1. Roger S. Pressman, Software Engineering: A Practitioner’s Approach, McGraw-Hill.

2. Ian Sommerville, Software Engineering, Pearson Education Inc., New Delhi

Reference Book:

1. Fundamentals of Software Engineering by Rajib Mall, – PHI

Course Code	Course Name	Hours Per Week			
CS3C012	Computer Networks	L	T	P	Credits
		3	1	2	5

UNIT-I

MAC Sublayer: Static and Dynamic Chanel Allocation in LAN, MAC protocols-ALOHA and SlottedALOHA,CSMA, CSMA/CD, CSMA/CA, Collision Free protocols, Limited Contention Protocols. Ethernet-Ethernet Cabling, Frame Format, Binary Exponential Back-off Algorithm, Ethernet Performance, Fast and Gigabit Ethernet,MAC address.

UNIT-II

Network Layer: Design issues, Routing algorithms:Dijkstra's algorithm, Bellman-ford algorithm, Link State Routing, Hierarchical Routing,Congestion Control Algorithms: General Principles of Congestion control, Prevention Policies, Congestion Control in Virtual-Circuit Subnets, Congestion Control in Datagram subnets. QOS-techniques for achieving good QOS, Traffic Management, Integrated and Differentiated Services. RSVP

UNIT-III

Internetworking, Tunnelling, Fragmentation and Reassembly. IP protocol, IPv4 Addresses, Subnet Addressing, Subnet Mask, SupernettingCIDR, NAT, ICMP-header, message type, trace route, ARP & RARP, BOOTP and DHCP: Address allocation, configuration & packet format, OSPF and BGP,Comparative study of IPv4 & IPv6.

UNIIT-IV

Transport Layer: Design Issues, Transport Service Primitives, Socket Programming, TCP: Connection Management, Reliability of Data Transfers, TCP Flow Control, TCP Congestion Control, TCP Header Format, TCP Timer Management. UDP: Header Format, RPC, RTP, Session layer: Authentication, Authorization, Session layer protocol (PAP, SCP, H.245).

UNIT-V

Presentation layer: Data conversion, Character code translation, Presentation layer protocol.Application Layer: WWW Architectural Overview, URL-Static and Dynamic Web, FTP, SSH, Email- Architecture and Services, SMTP, DNS-Name System, Resource Records, Name Servers, Network Management (SNMP).

Recommended Text Book: -

1. Computer Networks-V Edition, Andrew S. Tanenbaum-Pearson Education (Chapter No.4-7).
2. Data and Computer Communication-VIII Edition, William Stallings-Pearson Education (Part-3-6)
3. Data Communication and Networking- V Edition, Behrouz A.Fourouzan- Mc Graw Hill Publication (Part-3-6).
4. Communication Networks-Fundamental concepts and key Architecture, Alberto Leon-Garcia &IndraWidjaja-TMH (Unit1,2,7,8,10,12)

Practical Understanding

1. Data Communication Principles for fixed and wireless networks-Aftab Ahmad, Kluwer Academic Publishers.
2. Data Communications Networking Devices: -Operation, Utilization, Lan and Wan Interworking-IV Edition, Gilbert Held-John Wiley and Sons.

Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
EN3MC15	Universal Human Values and Professional Ethics	2	0	0	0

UNIT-I

Introduction-Need, Basic Guidelines, Content and Process for Value Education

Understanding the need, basic guidelines, content and process for Value Education, Self-Exploration – what is it ?-its content and process; 'Natural Acceptance' and Experiential Validation-as the mechanism for self - exploration, Continuous Happiness and Prosperity-A look at basic Human Aspirations, Right understanding, Relationship and Physical Facilities-the basic requirements for fulfilment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario, Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

UNIT-II

Understanding Harmony in the Human Being-Harmony in Myself

Understanding human being as a co-existence of the sentient 'I' and the material 'Body', Understanding the needs of Self ('I') and 'Body'- Sukhand Suvidha, Understanding the Body as an instrument of 'I'(I being the doer, seer and enjoyer), Understanding the characteristics and activities of 'I' and harmony in 'I', Understanding the harmony of I with the Body: Sanyamand Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya.

UNIT-III

Understanding Harmony in the Family and Society-Harmony in Human- Human Relationship

Understanding harmony in the Family- the basic unit of human interaction, Understanding values in human -human relationship ;meaning of Nyayaand program for its fulfilment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship, Understanding them eaning of Vishwas; Difference between intention and competence, Understanding the meaning of Samman ,Difference between respect and differentiation ;the other salient value in relationship, Understanding the harmony in the society(society being an extension of family):Samadhan, Samridhi, Abhay, Sah-astitvaas comprehensive Human Goals, Visualizing a universal harmonious order in society-Undivided Society (AkhandSamaj), Universal Order (SarvabhaumVyawastha)-from family to world family!.

UNIT- IV

Understanding Harmony in the Nature and Existence-Whole existence as Co-existence

Understanding the harmony in the Nature, inter connectedness and mutual fulfilment among the four orders of nature –recyclability and self-regulation in nature, Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence.

UNIT-V

Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in Professional Ethics:

a) Ability to utilize the professional competence for augmenting universal human order,
b) Ability to identify the scope and characteristics of people- friendly and eco-friendly production systems, technologies and management models, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order:
a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers,
b) At the level of society: as mutually enriching institutions and organizations.

TextBooks:

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

References:

1. IvanIllich,1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA
2. E.F. Schumacher,1973, Smallis Beautiful: a sudy of economics as if people mattered, Blond & Briggs, Britain.
3. SussanGeorge,1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
4. Donella H. Meadows, Dennis. Meadows, Jorgen Randers, William. BehrensIII, 1972, Limits to Growth–Club of Rome's report, Universe Books.
5. A Nagraj, 1998, Jeevan Vidya Ek Parichay, Divya Path Sansthan, Amarkantak.
6. P L Dhar, RRGaur,1990, Science and Humanism, Commonwealth Publishers.
7. A N Tripathy, 2003, Human Values, New Age International Publishers. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
8. EGSeebauer&RobertL.Berry,2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press
9. M Govindarajan, S Natrajan&V.S. SenthilKumar,EngineeringEthics(includingHumanValues), EasternEconomyEdition,PrenticeHallofIndia Ltd.
10. BP Banerjee,2005, Foundations of Ethics andManagement, Excel Books. BLBajpai,2004, IndianEthosandModernManagement,NewRoyal Book Co., Lucknow. Reprinted 2008.

Course Code	Course Name	Hours per Week			Total	Total
		L	T	P	Hrs.	Credits
EN3MC10	Soft Skills-III	2	0	0	2	0

UNIT 1: **Introducing your friend:** This session involves icebreaker activities to orient the students for the entire program. The activity is to try using as many adjectives as possible to describe one's friend. Students are encouraged to speak about their friends on the stage. Also, students will learn and practice introducing them (Self introduction) as self-introduction is usually the first question in any personal interview. Also, the appropriate way to introduce oneself is taught.

Who gets the heart? To improve reasoning, convincing and speaking skills of students. Student groups are provided with specific case of an individual in requirement of a heart along with the profile of the person. Student will advocate why the person they represent deserves to get the heart over others. This imparts the needed convincing skills for group discussions and personal interview where students need to convincingly put forth their opinion and views.

Debate: The objective of the session is to strengthen students' skills in the areas of leadership, interpersonal characteristics, influence over others, problem analysis, solution and presentation. Students are given topics and are made to debate on it. Cross-questioning is encouraged.

UNIT 2

Sentence correction: Subject-Verb Agreement, Modifiers, Parallelism

Vocabulary: Vocabulary Demystified, Synonyms and Antonyms, Word Analogy, Miscellaneous Vocabulary

UNIT 3

Sentence completion and Para- jumbles: Pro-active thinking, Reactive thinking (signpost words, root words, prefix suffix, sentence structure clues), Fixed jumbles, Anchored jumbles

Time and work: Work with different efficiencies, Pipes and cisterns, Work equivalency, Division of wages

UNIT 4

Data arrangements and blood relations: Linear Arrangement, Circular Arrangement, Multi-dimensional Arrangement, Blood Relations.

Reading comprehension: Speed Reading Strategies, RC - Types and Tackling Strategies.

UNIT 5

Story Mason: To make the students participate in group interactions, create dialogue and present on stage as a group. This activity allows introverts or students with stage fear to present a narration along with the group mates on the stage. This slowly helps those students to come out of their inhibition to speak in-front-of an audience.

Ratio and Proportion: Ratio, Proportion, Variation, Simple equations, Problems on Ages.

Articles, Prepositions and Interrogatives: Definite and Indefinite Articles, Omission of Articles, Prepositions, Compound

Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
CS3ES13	Software Workshop-II	0	0	2	1

This course has been associated with program electives of corresponding semester. The lab experiments of respective program electives will be performed during the lab hours for respective students.

Course Code	Course Name	Hours Per Week				
		L	T	P	Hrs.	Credits
CS3EL10	Cloud Computing	3	0	0	3	3

Unit I:
Introduction to cloud computing, characteristics of cloud computing as per NIST, cloud reference model, application of cloud computing ECG analysis, protein structure prediction, cloud deployment models.

Unit II:
Virtualization, virtualization advantages, Full virtualization, para-virtualization, hypervisors. Cloud interoperability, cloud service management, cloud analytics, Cloud broker, Capex, Opex, cloud architecture.

Unit III:
Platform as a service, Infrastructure as a service, software as a service, Desktop as a service, Backup as a service, DRaaS, Introduction to SLA, SLA lifecycle, SLA management, Business continuity plan.

Unit IV:
Cloud security fundamentals, vulnerability assessment, security architecture, identity management and access control, data at rest, data in flight, data in motion, security in virtualization.

Unit V:
Cloud application development platforms, Xen hypervisor, AWS, Google app engine, open stack.

Text Books:

1. S. Chand,R.Buyya, C. Vecchiola, S.T. Selvi, "Mastering Cloud Computing," McGraw Hill Education
2. T. Velte, A. Velte and R. Estenpeter, "Cloud Computing –A practical approach, McGraw Hill Education

Reference Books:

1. K. Chandrasekaran, "Essentials of Cloud Computing," CRC Press
2. Thomas Erl, Zaigham Mahmood, RichardoPuttini, Cloud Computing: Concepts, Technology & Architecture, ServiceTech press
3. K Jayaswal, J Kallakurchi, Donald Houde, Deven Shah, Cloud Computing Black Book, Dreamtech Press.

Course Code	Course Name	Hours Per Week			
		L	T	P	Credits
CS3EA07	Machine Learning	3	0	0	3

Unit I: Introduction to machine learning, Applications, Classification; Supervised Learning: Linear Regression: Cost function, Gradient descent; Logistic Regression, Nearest-Neighbors, Gaussian function.

Unit-II: Overfitting and Underfitting, Regularization, Bias and Variance, Decision Trees, Naïve Bayes, Support Vector Machines, Kernel Methods.

Unit III: Unsupervised Learning: Clustering: K-means, Dimensionality Reduction: PCA, Matrix Factorization and Matrix Completion, Ranking, Recommender System.

Unit IV: Introduction to Neural Network, Perceptron, Feed forward, Back Propogation, Recurrent Neural Network. Introduction to Python machine learning libraries: Keras, Tensorflow and Theano.

Unit V: Evaluating Machine Learning algorithms and Model Selection, Ensemble Methods: Boosting, Bagging, Random Forests, Deep learning Semi-supervised Learning, Reinforcement Learning.

Text Book:

1. Machine Learning, Tom Mitchell, McGraw Hill.
2. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press.
3. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer (freely available online)

Reference Books:

1. Christopher Bishop, Pattern Recognition and Machine Learning, Springer.
2. Hal Daumé III, A Course in Machine Learning (freely available online)
3. Sebastian Raschka,Vahid Mirjalili, Python Machine Learning: Machine Learning and Deep Learning with Python, scikit-learn, and TensorFlow, Packt Publishing.

Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
CS3EY02	Cryptography	3	0	0	3

Unit I: Introduction to Cryptography

The Confidentiality, Integrity & Availability (CIA) Triad, Cryptographic concepts, methodologies &practices, Symmetric &Asymmetric cryptography, public& private keys, Cryptographic algorithms and uses, Construction & use of Digital signatures

Unit II: Types of Algorithms

The basic functionality of hash/crypto algorithms (DES, RSA, SHA, MD5, HMAC, DSA) and effects on key length concepts in Elliptical Curve Cryptography & Quantum Cryptography.

Unit III: Key Management

The basic functions involved in key management including creation, distribution, verification, revocation and destruction, storage, recovery and life span and how these functions affect cryptographic integrity.

Unit IV: Application of Cryptography

Major key distribution methods and algorithms including Kerberos, ISAKMP etc., Vulnerabilities to cryptographic functions, the Use and functions of Certifying Authorities (CAs), Public Key Infrastructure (PKI) and System architecture requirements for implementing cryptographic functions, Web Services security, Cloud Security, VPNs.

Unit V: Cryptography in User Authentication

Basics of authentication, tokens, certificate-based and biometric authentication, extensible authentication protocols, and message digest, security handshake pitfalls, SSO, attacks on authentication schemes, email security

Text Books:

1. Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole, Wiley, 1st ed; 2008
2. Cryptography and Security by C K Shyamala, N Harini and Dr T R Padmanabhan, Wiley India, 1st ed; 2011
3. Cryptography and Network Security by AtulKahate, McGraw Hill India, 3rd ed; July 2017
4. Cryptography and Network Security by S. Bose, Pearson India, 1st ed; Mar 2016.
5. Cryptography and Information Security by V. K. Pachghare, Prentice Hall India, 2nd rev ed; 2015

Reference Book:

1. Understanding Cryptography: A Textbook for Students and Practitioners Hardcover, Springer, 1st ed; 2010
2. 2. Introduction to Modern Cryptography by Jonathan Katz, Chapman & Hall/CRC Cryptography, 2nd ed; 2014

3. Everyday Cryptography: Fundamental Principles and Applications by Keith Martin, OUP Oxford, 2nd ed; 2017.

Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
CS3ET02	Statistical Inferences	3	0	0	3

Unit I: Introduction to Statistical Inference

History and development of statistical inference, introduction to statistical hypothesis, types of hypothesis – simple and composite, fundamental concepts of null hypothesis, alternative hypothesis, critical region, two types of statistical errors: type I and II error, importance of type I & II error, level of significance, confidence level and critical region, most powerful test, uniformly most powerful test and their construction, Neyman Pearson Lemma, application and importance of Neyman Pearson Lemma, unbiased test and unbiased critical region, concepts of likelihood ratio test.

Unit II: Testing of Hypothesis – Parametric Test

Introduction to Testing of hypothesis, steps involved in Hypothesis testing, small sample test : t test for one sample mean and two sample mean, F test for equality of two variances, Large sample test : Z test, single mean, two mean, single proportion and two proportions, test for the variance of normal distribution, test for the equality of two or more than two normal distributions, confidence interval for population arithmetic mean, confidence interval for population variance.

Unit III: Testing of Hypothesis: Non-Parametric test

Introduction to non-parametric test, run test, Wilcoxon signed Rank Test, Wilcoxon Matched signed pair rank test, Mann-Whiteney U test, Kruskal Wallis test, Fried Man Rank Test for small sample and large sample, Goodness of fit test and independence of attributes using χ^2 test, testing of equality of more than two variances using χ^2 test.

Unit IV: Parameter Estimation

Introduction to estimation, central limit theorem and its application, types of estimation, properties of good estimator – unbiasedness, consistency, efficiency and sufficiency, Method of estimation – maximum likelihood estimation, properties of method of maximum likelihood estimator, estimation of mean and variance of normal distribution using maximum likelihood estimator, introduction and assumptions of ordinary least square method, estimation of parameters in multiple linear regression coefficients, properties of the OLS method.

Unit V: Bayesian Statistical Inference

Introduction to Bayes inference, Bayesian Procedures – Prior and posterior distributions, point estimation of Bayesian statistic, Bayesian Interval estimation, Bayesian testing procedures, Bayesian sequential procedures, important terms related to Bayesian statistical inference, introduction to modern Bayesian statistical inference, simple problems related to Bayesian inference and estimations.

Text Books

1. Fundamentals of Mathematical Statistics – SC Gupta and VK Kapoor, Sultan Chand & Sons Publication, New Delhi

Reference Books

1. Introduction to probability Models, Ninth Edition – Sheldon M. Ross, Elsevier Puplication, Academic Press, UK
2. An introduction to Probability and Statistical Inference – George Roussas, Academic Press

Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
OE00071	Server Administration	3	0	0	3

Unit I: Installing and Configuring Windows Server 2012 Introduction, Selecting a Windows Server 2012 Edition, Supporting Server Roles and Features, Server Licensing, Installing Windows Server 2012: System Requirement, Performing a Clean Installation, Working with Installation Partitions, Server Core Defaults, Server Core Capabilities, Completing Post-Installation Tasks, Converting Between GUI and Server Core, Upgrade paths, Installing Windows Server Migration Tools, Configuring NIC Teaming, Configuring local storage, Configuring WDS to install OS through networking.

Unit II: Securing Files and Disks.

How to Securing Files, Encryption files with EFS, Configuring EFS, Using the Cipher Command, Sharing Files Protected with EFS with others, Configuring EFS with Group Policies, Configuring EFS Recovery Agent, Managing EFS Certificates, Encrypting Files with BitLocker, Configuring BitLocker Encryption, configuring BitLocker to Go, Configuring BitLocker Policies, Managing BitLocker Certificates.

Unit III: Configuring File and Share Access Permissions

Designing a File-Sharing Strategy, Arranging Shares, Controlling Access, Mapping Drives, Creating Folder Shares, Assigning Permissions, Understanding the windows Permission Architecture and Basic, Advanced Permissions, Allowing and Denying Permissions, Inheriting Permissions, Understanding Effective Access, Setting Share Permissions, Understanding NTFS Authorization, Assigning Basic NTFS Permissions, Understanding Resource Ownership, Combining Share and NTFS Permissions, Installing File Server Resource Manager, Using, creating, changing Quotas, Managing Files with File Screening, Creating File Groups, Creating a File Screen, Creating a File Screen Exception, Creating a File screen Template. Storage Reports Management.

Unit IV: Configuring DNS Zones and Records

Understanding DNS, Understanding DNS Names and Zones, Understanding the Address Resolution Mechanism, configuring and Managing DNS Zones, Installing DNS, Configuring Primary and Secondary Zones, Configuring Active Directory-Integrated Zones, configuring Zone Delegation, configuring Stub Zones, configuring Caching-Only Servers, Configuring Forwarding and Conditional Forwarding, Configuring DNS Record types, creating and Configuring DNS Resource Records, Start of Authority(SOA) Records, Name Server(NS) Records, Host(A and AAAA) Records, Canonical Name(CNAME) Records, Pointer(PTR) Records..

Unit V: Implementing Patch Management and Monitoring Server Performance

Understanding windows Updates and Automatic Updates, Deploying Windows Server Update Services(WSUS), How to Install and Configure WSUS, Configuring WSUS Synchronization, Configuring WSUS Computer Groups, Configuring Group Policies for Updates, Configuring Client-Side Targeting, Approving Updates, Viewing Reports, Administrating WSUS with Commands, Troubleshooting Problems with Installing Updates.

Introducing the Microsoft Management Console (MMC), Server Manager, Event Viewer, Understanding Logs and Events, Adding and Filtering Events, Managing Performance, Task Manager, Resource Monitor, Configuring Data Collector Sets (DCS), Monitoring the Network using Netstat and protocol analyzers.

Text Books:

1. Windows Server 2012: A Handbook for Professionals by Aditya Raj (Author)
2. Administering Windows Server 2012 (Certification Guide) by Orin Thomas

Reference Book:

1. Administering Widows Server 2012 by Patrick Regan
2. Mastering Windows Server 2012 R2 by Mark Minasi, Kevin Greene, Christian Booth, and Robert Butler.

Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
OE00072	Introduction to Data Science	3	0	0	3

Unit I: Data Science - An Overview

Introduction to Data Science, Definition and description of Data Science, history and development of Data Science, terminologies related with Data Science, basic framework and architecture, difference between Data Science and business analytics, importance of Data Science in today's business world, primary components of Data Science, users of Data Science and its hierarchy, overview of different Data Science techniques, challenges and opportunities in business analytics, different industrial application of Data Science techniques.

Unit II: Mathematics and Statistics in Data Science

Role of mathematics in Data Science, importance of probability and statistics in Data Science, important types of statistical measures in Data Science : Descriptive, Predictive and prescriptive statistics, introduction to statistical inference and its usage in Data Science, application of statistical techniques in Data Science, overview of linear algebra : matrix and vector theory, role of linear algebra in Data Science, exploratory data analysis and visualization techniques, difference between exploratory and descriptive statistics, EDA and visualization as key component of Data Science.

Unit III: Machine Learning in Data Science

Role of machine learning in Data Science, different types of machine learning techniques and its broad scope in Data Science : Supervised, unsupervised, reinforcement and deep learning, difference between different machine learning techniques, brief introduction to machine learning algorithms, importance of machine learning in today's business, difference between machine learning classification and prediction.

Unit IV:Computers in Data Science

Role of computer science in Data Science, various components of computer science being used for Data Science, role of relation data base systems in Data Science: SQL, NoSQL, role of data warehousing in Data Science, terms related with data warehousing techniques, importance of operating concepts and memory management, various freely available software tools used in Data Science : R, Python, important proprietary software tools, different business intelligence tools and its crucial role in Data Science project presentation.

Unit V:Data Science Project Management

Data Science project framework, execution flow of a Data Science project, various components of Data Science projects, stakeholders of Data Science project, industry use cases of Data Science implementation, challenges and scope of Data Science project management, process evaluation model, comparison of Data Science project methods, improvement in success of Data Science project models.

Text books:

1. Data Science from Scratch: First Principles with Python 1st Edition by Joel Grus
2. Principles of Data Science by Sinan Ozdemir, (2016) PACKT.

Reference Books:

1. Data Science For Dummies by Lillian Pierson (2015)
2. Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking by Foster Provost, Tom Fawcett
3. Data Smart: Using Data Science to Transform Information into Insight 1st Edition by John W. Foreman. (2015) Wiley Publication.

Course Code	Course Name	Hours Per Week			
		L	T	P	Credits
OE00015	Agile Development	3	0	0	3

Unit-I

Understanding Agile: Introduction to Agile Project Management, Agile Manifesto, Agile Principles, Agile Benefits: Product Development and customers, Development teams etc.

Unit-II

Agile Frameworks: Agile approaches, reviewing the big three: Lean, Extreme programming and Scrum. Putting Agile in action: Environment, Behaviors- Agile roles, New values, Team philosophy.

Unit-III

Working in Agile: Planning in Agile, product vision, creating the product roadmap, refining requirement and estimates, release planning and Sprint planning.

Unit-IV

Managing in Agile: Managing Scope and procurement, managing time and cost, team dynamics and communication, managing quality and risk

Unit-V

Ensuring Agile Success: Building a foundation- Commitment, choosing the right project team members- Development team, scrum master etc. Being a change agent, Key benefits and key resources for agile project management.

Text Books:

1. Mark C. Layton, Agile Project Management For Dummies, Wiley publishers
2. Jim Robert Highsmith, Agile Project Management: Creating Innovative Products, Pearson education
3. Hitzler, Markus, Rudolph , Foundations of Semantic Web Technologies, Chapman & Hall/CRC
4. Allemang , Hendler , Semantic Web for the working Ontologist, Elsevier Pub

Reference Books:

1. Charles G. Cobb, Making Sense of Agile Project Management: Balancing Control and Agility, Wiley
2. Mike Cohn, Agile Estimating and Planning, Pearson
3. Liz Sedley and Rachel Davies, Agile Coaching, The Pragmetic Bookshelf

Course Code	Course Name	Hours Per Week				
		L	T	P	Hrs.	Credits
OE00016	Blockchain Architecture	3	0	0	3	3

Unit I: Cryptocurrency: History, electronic cash, double spending problem, Bitcoin protocols, Mining strategy and rewards, Types of crypto currency wallets, Legal aspects of crypto currency, Crypto currency exchanges.

Unit II: Introduction to Blockchain: History of blockchain, Hash functions, SHA-256, Symmetric cryptography, Asymmetric cryptography, Keys & Digital signatures, benefits and limitation of block chain, features of blockchain.

Unit III: Consensus: Nakamoto consensus, Proof of work, Proof of stake, Proof of burn, Difficulty Level, Sybil attack, Energy utilization, collision of energy utilization, Introduction to ethereum.

Unit IV: Blockchain Architectures: Blockchain network, Merkle patricia Tree, Soft & hard fork, Private and public blockchain, Tokenized blockchain.

Unit V: Blockchain Applications: Financial Sector, Medical record management system, domain name service and future of block chain, case study: Government on blockchain. Introduction to hashgraph and tangle.

Text Books:

1. Andreas Antonopoulos “Mastering Bitcoin Unlocking Digital Cryptocurrencies” O’Reilly publication.
2. Imran Bashir “Mastering Blockchain: Distributed ledger technology, decentralization, Packt publishing”.

Reference Books:

1. Wattenhofer, The Science of the Blockchain
2. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, “Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction” Princeton University.

Course Code	Course Name	Hours Per Week				
		L	T	P	Hrs.	Credits
OE00018	**Python Essentials**	3	0	0	3	3

UNIT-I-Basic Introduction

Introduction to Python, History, Features, command interpreter and development environment-IDLE, Application of Python, Python 2/3 differences, Basic program structure-quotation and indentation, Operator, Basic data types and In-built objects.

UNIT-II-Function and Sequence

Functions: definition and use, Arguments, Block structure, scope, Recursion, Argument passing, Conditionals and Boolean expressions, Lambda Function, inbuild functions (str(),globals(),locals(),vars(),eval(),exec(),execfile(),repr(),ascii()) Sequences: Strings, Tuples, Lists Iteration, looping and control flow, String methods and formatting.

UNIT-III-File Operation & OOPS concepts

Reading config files in python, Writing log files in python, Understanding read functions, read(), readline() and readlines(), Understanding write functions, write() and writelines(), Manipulating file pointer using seek.

UNIT-IV- OOPS Concepts

Object Oriented concepts- Encapsulation, Polymorphism**,** Classes, Class instances, Constructors & Destructors__init__, __del__, Multiple inheritance, Operator overloading Properties, Special methods, Emulating built-in types.

UNIT-V-Mutable data types, Exception and Standard modules

Dictionaries, Sets and Mutability, Exceptions, List and Dict Comprehensions, Standard Modules-math, random Packages.

Text Book:

1. Dr.R.Nageswara Rao, Core Python Programming, dreamtech press.
2. Paul Barry, Head First Python, O'REILLY.

Reference Book:

1. Mark Luiz, Learning Python, O'REILLY.
2. Jamie Chan, Learn Python in One Day, LCF Publishing.