No. KU/Aca(S&T)/JS-155/BOS /Comp.Sci. (PG) /23-24/ **1435**　　　　Date: **2 9 JAN 2024**

ಅಧಿಸೂಚನೆ

ವಿಷಯ: 2023–24ನೇ ಸಾಲಿನಿಂದ M.C.A.-II & III Semester (DSE) OEC Programmeಗೆ ಪಠ್ಯಕ್ರಮವನ್ನು ಅಳವಡಿಸಿರುವ ಕುರಿತು.

ಉಲ್ಲೇಖ: 1. ಅಭ್ಯಾಸಸೂಚಿ ಮಂಡಳಿ ಸಭೆಯ ನಿರ್ಣಯ ಸಂ. 06, ದಿನಾಂಕ: 14.08.2023.

　　　2. ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ನಿರ್ಣಯ ಸಂ. 29, ದಿನಾಂಕ: 31.08.2023.

　　　3. ಕಚೇರಿ ಪತ್ರ ಸಂ.KU/Aca(S&T)/JS-155/BOS/Comp.Sci.(PG)/23-24/76, ದಿ.03.10.2023.

　　　4. ಅಧ್ಯಕ್ಷರು, ಗಣಕಯಂತ್ರ ವಿಜ್ಞಾನ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ ಇವರ ಪತ್ರ ದಿ.19.01.2024.

　　　5. ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಅನುಮೋದನೆ ದಿನಾಂಕ: **27/01/2024**

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ಮೇಲ್ಕಾಣಿಸಿದ ವಿಷಯ ಹಾಗೂ ಉಲ್ಲೇಖಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ, ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಅನುಮೋದನೆ ಮೇರೆಗೆ 2023–24ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಅನ್ವಯವಾಗುವಂತೆ M.C.A.-II & III Semester (DSE) OEC ಪಠ್ಯಕ್ರಮವನ್ನು ಮುಂಬರುವ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ನಿರೀಕ್ಷೆಯಲ್ಲಿರಿಸಿ (Pending Approval of Academic Council Meeting) ಅಧಿಸೂಚನೆಯನ್ನು ಪ್ರಕಟಿಸಿದೆ. ಅದರಂತೆ, ಪಠ್ಯಕ್ರಮವನ್ನು ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ www.kud.ac.in ದಲ್ಲಿ ಬಿತ್ತರಿಸಲಾಗಿದೆ. ಸದರ ಪಠ್ಯಕ್ರಮವನ್ನು ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲದಿಂದ ಡೌನ್‌ಲೋಡ್ ಮಾಡಿಕೊಳ್ಳಲು ಸೂಚಿಸುತ್ತಾ, ವಿದ್ಯಾರ್ಥಿಗಳು ಹಾಗೂ ಸಂಬಂಧಿಸಿದ ಬೋಧಕ ಸಿಬ್ಬಂದಿಗಳ ಗಮನಕ್ಕೆ ತಂದು ಅದರಂತೆ ಕಾರ್ಯ ಪ್ರವೃತ್ತರಾಗಲು ಸೂಚಿಸಲಾಗಿದೆ.

ಕುಲಸಚಿವರು

ಗೆ,

ಅಧ್ಯಕ್ಷರು, ಗಣಕಯಂತ್ರ ವಿಜ್ಞಾನ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ

ಪ್ರತಿ ಮಾಹಿತಿಗಾಗಿ: ಡೀನರು, ವಿಜ್ಞಾನ & ತಂತ್ರಜ್ಞಾನ ನಿಖಾಯ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

ಸಾದರಪೂರ್ವಕವಾಗಿ ಪ್ರತಿ:

1. ಕುಲಪತಿಗಳ ಆಪ್ತಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

2. ಕುಲಸಚಿವರ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

3. ಕುಲಸಚಿವರು (ಮೌಲ್ಯಮಾಪನ) ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

4. ನಿರ್ದೇಶಕರು, ಐ.ಟಿ. ಶಾಖೆ, ಪರೀಕ್ಷಾ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

5. ಸಿಸ್ಟಮ್ ವಿಶ್ಲೇಷಕರು (System Analysist), ಗಣಕಯಂತ್ರ ಶಾಖೆ, ಪರೀಕ್ಷಾ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

6. ಅಧೀಕ್ಷಕರು, ಪರೀಕ್ಷಾ ಗೌಪ್ಯ/ ಸ್ನಾತಕೋತ್ತರ / ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ / ಸಾಮಾನ್ಯ ಆಡಳಿತ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

7. ಅಧೀಕ್ಷಕರು, ಸಿ.ಡಿ.ಸಿ. (ಸಂಯೋಜನೆ) ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

Sem. No.	Paper Code	Paper Title	Credits	No. of Hrs/Week Theory/ Practical	Duration of exam In Hrs Theory/ Practical	Internal Assessment Marks Theory/ Practical	Marks at the Exams	Total Marks
	Open Elective							
	DSE	1.Cyber Security 2.Block chain technology	4	4	3	25	75	100
		Total						

MCA 2ⁿᵈ Semester

Cyber Security

Unit I: Introduction to Cyber Security

Introduction, Computer Security, Threats, Harm, Vulnerabilities, Controls, Authentication, AccessControl and Cryptography.Web attack: Browser Attacks, Web Attacks Targeting Users, ObtainingUser or Website Data, Email Attacks. Network Vulnerabilities: Overview of vulnerability scanning,OpenPort/ServiceIdentification,Banner/VersionCheck,TrafficProbe,VulnerabilityProbe,Vulnerability Examples, OpenVAS, Metasploit. Networks Vulnerability Scanning (Netcat, Socat),Network Sniffers and Injection tools.

Unit 2: Network Defence tools

Firewalls and Packet Filters: Firewall Basics, Packet Filter Vs Firewall, How a Firewall Protects aNetwork, Packet Characteristic to Filter, Stateless VsStateful Firewalls, Network Address Translation(NAT) and Port Forwarding. VPN: the basic of Virtual Private Networks. Firewall: Introduction,Linux Firewall, Windows Firewall.Snort: Introduction Detection System.

Unit 3: Web Application Tools

Scanning for web vulnerabilities tools:Nikto, W3af, HTTP utilities - Curl, OpenSSL and Stunnel.Application Inspection tools – Zed Attack Proxy, Sqlmap, DVWA, Webgoat.Password Cracking andBrute-Force Tools: John the Ripper, L0htcrack, Pwdump, HTC-Hydra.

Unit 4: Introduction to Cyber Crime, law and Investigation

Cyber Crimes, Types of Cybercrime, Hacking, Attack vectors, Cyberspace and Criminal Behaviour,ClarificationofTerms,TraditionalProblemsAssociatedwithComputerCrime,IntroductiontoIncident Response, Digital Forensics, Computer Language, Network Language, Realms of the Cyberworld.Internet crime and Act: A Brief History of the Internet, Recognizing and Defining ComputerCrime,ContemporaryCrimes,ComputersasTargets,ContaminantsandDestructionofData,IndianIT ACT 2000. Firewalls and Packet Filters, password Cracking, Keyloggers and Spyware, Virus andWarms, Trojan and backdoors, Steganography, DOS and DDOS attack.

Unit 5: Cyber Ethics

Introduction,importanceofcyberethics,typesofcyberethics,risksandchallengeswithcyberethics:cyberbull ying,onlineharrasement,invasionofprivacy,identitytheft,Phishingscams,hackingand the spread of false information, ethical issues:Privacy,accuracy,property and accessability.

REFERENCE BOOKS:
1. William Stallings, Effective Cyber Security: A Guide to Using Best Practices andStandards, Addison-Wesley Professional, ISBN-13: 978-0134772806.
2. NinaGodbole&SunitBelapure,CyberSecurity,WileyIndia,2012,ISBN:9788126521791.
3. MikeShema,Anti-HackerToolKit(IndianEdition),4thEdition,PublicationMcGraw Hill, ISBN: 9789339212155.
4. NinaGodboleandSunitBelpure,CyberSecurityUnderstandingCyberCrimes,ComputerF orensicsandLegalPerspectives,WileyPublication,ISBN9788126521791.

MCA 2nd Semester

Block Chain

TechnologyUnit-1 INTRODUCTION TO

BLOCKCHAIN
Blockchain- A history of Blockchain-how the computation environment evolved, What is aBlockchain, Problems with centralized system, Centralized vs decentralized vs distributed,Blockchain as Public Ledgers, Bitcoin and Blockchain, Technology behind bitcoin—TheBlockchain,Blockchain 2.0 and Smart Contracts, Block in a Blockchain-securing
data,StructureofaBlock,BlockHeader,TheblockchainReplicas,DistributedConsensus,Permission less consensus and Permissioned Model of Blockchain 2.0, Cryptographicallysecured Hash Function, Cryptographically secured chain of blocks,Properties of a hashfunction-Hash pointer,Merkle tree and its use.

Unit-2 BITCOIN AND CRYPTOCURRENCY
Abasiccryptoprimitives:Digitalsignature,reducingsignaturesize,introductiontocryptocurrency using digital signature and hashchain, What is bitcoin, Creation of bitcoins,Payments and double spending, FORTH – How FORTH works, Bitcoin Scripts , Bitcoin P2PNetwork, Transaction in Bitcoin Network , Block Mining in bitcoin network, Block Flooding,Block propagation and block relay.

Unit-3 BITCOIN CONSENSUS
 Introduction to Consensus, Distributed consensus, Consensus in a Bitcoin network, Proof ofWork (PoW)- Cryptographic Hash as PoW, HashcashPoW,BitcoinPoW, Tempering ofPoW- Sybil attacks, DoS attacks, PoW power consumption, monopoly problem- Proof ofStake, Proof of Burn, Proof of Elapsed Time. Basics of PoET, Mining bitcoin, Difficulty inmining, Hash rate vs difficulty, Mining Pool, Permissioned model of blockchain and usecases, Design issues for Permissioned Blockchains, State machine replication, smart contractstate machine – crowd funding, Distributed state machine replication.

Unit-4DISTRIBUTEDCONSENSUS,HYPERLEDGERFABRIC&ETHERUM
Consensusalgorithm-RAFTConsensus,PAXOSconsensus,Byzantinegeneralmodel,Byzantine general problem, Lamport-Shostak-Pease, Practical Byzantine Fault Tolerance.Introduction to hyperledger fabric v1.1, Architecture of Hyperledger fabric v1.1, Ethereum:Ethereumnetwork,EVM,Transactionfee,MistBrowser,Ether,Gas,Solidity,Smartcontracts, Truffle-Design and issue Crypto currency, Mining, DApps, DAO.

Unit-5 BLOCKCHAIN APPLICATIONS
Understanding business problems, understanding the participants, Building communities inblockchainnetwork,BlockchaininFinancialservices,Supplychainmanagement,revolutionizing global trade.

Text Books:
1. MasteringBlockchain:Deeperinsightsintodecentralization,cryptography,Bitcoin,and popular Blockchain frameworks by Bashir, Imran,2017.
2. BeginningBlockchain:ABeginner'sGuidetoBuildingBlockchainSolutions,byBikramadi tyaSinghal, GautamDhameja, PriyansuSekhar Panda, Apress.

Reference Books:
1. Blockchain:AStep-by-stepGuideforBeginnerstoImplementingBlockchainTechnology and Leveraging Blockchain Programming, Tailor Jacobs, Copyrighted byTailor Jacobs, 2017.
2. Basic Blockchain: What It Is and How It Will Transform the Way We Work and Live,David A Shrier, Robinson Publication.
3. Blockchain : The next Every Thing, Stephen P Williams, Copyrighted by Stephen PWilliams, 2019.

Sem. No.	Paper Code	Paper Title	Credits	No. of Hrs/Week Theory/ Practical	Duration of exam In Hrs Theory/ Practical	Internal Assessment Marks Theory/ Practical	Marks at the Exams	Total Marks
	Open Elective							
	DSE	1.Information Storage and management 2.Multimedia Technology	4	4	3	25	75	100
		Total						

MCA 3rd Semester
INFORMATION STORAGE AND MANAGEMENTUnit-1 INTRODUCTION TO STORAGE TECHNOLOGY

Data proliferation and the varying value of data with time & usage, sources of data and statesof data creation, Data centre requirements and evolution to accommodate storage needs,Overview of basic storage management skills and activities, The five pillars of technology,Overview of storage infrastructure components, Evolution of storage, Information LifecycleManagement concept, Data categorization within an enterprise, Storage and Regulations.

Unit-2 STORAGE SYSTEMS ARCHITECTURE:

Intelligent disk subsystems overview, Contrast of integrated vs. modular arrays, Componentarchitecture of intelligent disk subsystems, Disk physical structure components, properties,performance, and specifications, Logical partitioning of disks, RAID & parity algorithms, hotsparing, Physical vs. logical disk organization, protection, and back end management, Arraycaching properties and algorithms, Front end connectivity and queuing properties, Front endto host storage provisioning, mapping, and operation, Interaction of file systems with storage,Storage system connectivity protocols.

Unit-3 INTRODUCTION TO NETWORKED STORAGE
JBOD, DAS, SAN, NAS, & CAS evolution, Direct Attached Storage (DAS) environments:elements,connectivity,&management,StorageAreaNetworks(SAN):elements&connectivity, Fibre Channel principles, standards, & network management principles, SANmanagement principles, Network Attached Storage (NAS): elements, connectivity options,connectivityprotocols(NFS,CIFS,ftp),&managementprinciples,IPSANelements,standards (iSCSI, FCIP, iFCP), connectivity principles, security, and management principles,ContentAddressableStorage(CAS):elements,connectivityoptions,standards,andmanagementprinciples,HybridStoragesolutionsoverviewincludingtechnologieslikevirtualization & appliances

Unit-4 INTRODUCTIONS TO INFORMATION AVAILABILITY

Business Continuity and Disaster Recovery Basics, Local business continuity techniques,Remotebusinesscontinuitytechniques,DisasterRecoveryprinciples&techniques.Ma naging & Monitoring.Management philosophies (holistic vs. system & component),Industrymanagementstandards(SNMP,SMI-S,CIM),Standardframeworkapplications,Key management metrics (thresholds, availability, capacity, security, performance), Metricanalysis methodologies & trend analysis, Reactive and proactive management best practices,Provisioning&configurationchangeplanning,Problemreporting,prioritization,andhan dling techniques, Management tools overview.

Unit-5 SECURING STORAGE AND STORAGE VIRTUALIZATION

Define storage security, List the critical security attributes for information systems, describethe elements of a shared storage model and security extensions, Define storage securitydomains,Listandanalyzethecommonthreatsineachdomain,Identifydifferentvirtualizatio n technologies, describe block-level and file level virtualization technologies andprocesses.

Text Books:

1.InformationStorageandManagement,Storing,Managing,andProtectingDigitalInformation inClassic,Virtualized,andCloudEnvironments,2ndEdition,EMCEducational Services, Wiley 2012.

Reference Books:

1. EMC students guide.
2. Marc Farley Osborne, "Building Storage Networks", Tata Mcgraw Hill.
3. Robert Spalding, "Storage Networks: The Complete Reference", Tata Mcgraw Hill.
4. Storage Area Network Fundamentals , Meeta Gupta, Pearson Education Limited
5. InformationStorage&RetrievalSystemsTheory&Implementation,GeraldJKowalski / Mark T Maybury, BS Publications.
6. DisasterRecovery&BusinessContinuity-ThejendraBS,ShroffPublishers&Distributors.
7. BladeServers&Virtualization-BarbGoldworm/AnneSkamarock,WileyIndiaPvt.Ltd.

Multimedia Technology

Unit 1: Introduction

Motivation, evolution of multimedia, structure and components of multimedia, applicationdomain, Internet and multimedia, hypertext, hypermedia, browser and helper applicationoverview,userinterfacedesignissues.SoundandAudioTechnology:Psychoacoustics:f requency and amplitude sensitivity of hearing, music and noise, stereo effects, masking;Frequency domain compression of analog signal, digitization of audio signal: sampling andcoding, digital audio signal processing, architecture of sound card, electronic music andsynthesizer,

Unit 2:Musical Instrument Digital Interface (MIDI)

Interface, protocol and data format. Image and Graphics: Principles of raster graphics: visualdisplay concept, resolution, colors and pallets, refresh rate and graphics accelerators; digitalimage representation and format, graphic drafting tools, image enhancement, color printerprinciples, image scanner principles, digital still camera principles, file formats.

Unit 3: Video Technology

Analogvideoprinciplesandbroadcaststandards,CCDCamera,recordingformatsandstandard; digital video principles, TV cards, frame grabber principles, IDTV and HDTVprinciplesAnimationandSpecialEffects:Historyofanimation,animationprinciples,animat ion techniques, shockwave animation, survey of animation tools and file formats,special visual effects.

Unit 4: Storage Media

Magneticmediaprinciplesandstoragedensity,principlesofCDtechnology:CDROM,CDRW and CDDA format and principles, IDE, SCSI and USB interfaces to storage devices.DataCompression:Informationtheorybasedandfrequencydomainbasedcompression,ba sic compression techniques (DPCM, RLE, Huffman Coding etc), JPEG/ISO, H261,H263,MPEG-1,2,4,7, DVI.

Unit 5: Multimedia Document Interchange Formats

Hypertext, HTML, MHEG, SGML, Open Document Architecture, Open Media Framework.Authoring Tools and Metaphors: Authoring tools: Productivity and Creativity, survey ofauthoring tools:book metaphor, slideshow metaphor, time-line metaphor, network and iconmetaphor.

Reference:
1. P.K. Andleighand K. Thakrar, Multimedia System Design, [PHI]
2. R. Steinmetz and K. Nashtedt, Miltimedia Computing, Communication &Applications, [PHI]
3. F. Hulshall, Multimedia Communication, [Pearson Ed.]
4. J.F.K. Buford, Multimedia System, [Pearson Ed.]
5. S.Fisher,MultimediaAuthoring:BuildingandDevelopingDocuments,[APProfessional]