



**Syllabus for Mid Term Test**

SUBJECT	syllabus
SEM VII	Mid Term Test
<b>Deep Learning</b>	<p><b>Fundamentals of Neural Network</b></p> <p>1.1 History of Deep Learning, Deep Learning Success Stories, Multilayer Perceptrons (MLPs), Representation Power of MLPs, Sigmoid Neurons, Gradient Descent, Feedforward Neural Networks, Representation Power of Feedforward Neural Networks</p> <p>1.2 Deep Networks: Three Classes of Deep Learning Basic Terminologies of Deep Learning</p> <p><b>Training, Optimization and Regularization of Deep Neural Network</b></p> <p>2.1 Training Feedforward DNN Multi Layered Feed Forward Neural Network, Learning Factors, Activation functions: Tanh, Logistic, Linear, Softmax, ReLU, Leaky ReLU, Loss functions: Squared Error loss, Cross Entropy, Choosing output function and loss function</p> <p>2.2 Optimization Learning with backpropagation, Learning Parameters: Gradient Descent (GD), Stochastic and Mini Batch GD, Momentum Based GD, Nesterov Accelerated GD, AdaGrad, Adam, RMSProp</p> <p>2.3 Regularization</p> <p>Overview of Overfitting, Types of biases, Bias Variance Tradeoff</p> <p>Regularization Methods: L1, L2 regularization, Parameter sharing, Dropout, Weight Decay, Batch normalization, Early stopping, Data Augmentation, Adding noise to input and output</p> <p><b>Autoencoders: Unsupervised Learning</b></p> <p>3.1 Introduction, Linear Autoencoder, Undercomplete Autoencoder, Overcomplete Autoencoders, Regularization in Autoencoders</p> <p>3.2 Denoising Autoencoders, Sparse Autoencoders, Contractive Autoencoders</p> <p>3.3 Application of Autoencoders: Image Compression</p>
<b>Big Data Analytics</b>	<p><b>Introduction to Big Data</b></p> <p>1.1 Introduction to Big Data, Big Data characteristics, types of Big Data, Traditional vs. Big Data business approach, Big Data Challenges, Examples of Big Data in Real Life, Big Data Applications</p> <p><b>Introduction to Big Data Frameworks: Hadoop</b></p> <p>2.1 What is Hadoop? Core Hadoop Components; Hadoop Ecosystem; Overview of : Apache Spark, Pig, Hive, Hbase, Sqoop</p> <p><b>MapReduce Paradigm</b></p> <p>3.1 Introduction to Map Reduce: The Map Tasks, Grouping by Key, The Reduce Tasks, Combiners, Partitioners, Details of MapReduce Execution, Coping With Node Failures. Algorithms Using MapReduce: Matrix-Vector</p>



**Artificial Intelligence and Data Science**

	Multiplication Relational-Algebra Operations - Computing Selections, Projections, Union, Intersection, and Difference Database operations - Computing Natural Join, Group By and Aggregation Matrix Multiplication with two and One MapReduce Steps. Illustrating benefits of MapReduce Real life examples of databases and applications.
<b>Department Level Course 3-NLP</b>	<p>1 Introduction : 1.1 Origin &amp; History of NLP, The need of NLP, Generic NLP System, Levels of NLP, Knowledge in Language Processing, Ambiguity in Natural . Language, Challenges of NLP, Applications of NLP.</p> <p>2 Word Level Analysis : 2.1 Tokenization, Stemming, Segmentation, Lemmatization, Edit Distance, Collocations, Finite Automata, Finite State Transducers (FST), Porter Stemmer, Morphological Analysis, Derivational and Reflectional Morphology, Regular expression with types. 2.2 N –Grams, Unigrams/Bigrams Language Models, Corpora, Computing the Probability of Word Sequence, Training and Testing.</p> <p>3 Syntax analysis : 3.1 Part-Of-Speech Tagging (POS) - Open and Closed Words. Tag Set for English (Penn Treebank), Rule Based POS Tagging, Transformation Based Tagging, Stochastic POS Tagging and Issues –Multiple Tags &amp; Words, Unknown Words. 3.2 Introduction to CFG, Hidden Markov Model (HMM), Maximum Entropy,</p>
<b>Department Level Course -4(UXD )</b>	<p><b>Introduction</b></p> <p>1.1 Introduction to interface design, Understanding and conceptualizing Interface, understanding user's conceptual cognition, Core Elements of User Experience, Working of UX elements.</p> <p><b>The UX Design - life cycle</b></p> <p>2.1 What is UX, Ubiquitous interaction, Emerging desire for usability, From usability to user experience, Emotional impact as part of the user experience, User experience needs a business case, Roots of usability.</p> <p>2.2 Introduction, A UX process lifecycle template, Choosing a process instance for your project, The system complexity space, Meet the user interface team, Scope of UX presence within the team, More about UX lifecycles.</p> <p><b>The UX Design Process</b></p> <p>3.1 Introduction, The system concept statement, User work activity gathering, Look for emotional aspects of work practice, Abridged contextual inquiry process, Data-driven vs. model driven inquiry, Contextual Analysis, Extracting Interaction Design Requirements, Constructing Design Information Models.</p> <p>3.2 Information ,Architecture and Interaction Design and Prototyping Introduction, Design paradigms, Design thinking, Design perspectives, User personas, Ideation, Sketching, More about phenomenology, Mental Models and Conceptual Design, Wireframe, Prototyping</p>
<b>Department Level</b>	<b>Introduction</b>



**Artificial Intelligence and Data Science**

<p><b>Course -4 (GDS)</b></p>	<p>Making rational choices: basics of Games – strategy – preferences – payoffs – Mathematical basics – Game theory – Rational Choice – Basic solution concepts-non-cooperative versus cooperative games – Basic computational issues – finding equilibria and learning in gamesTypical application areas for game theory (e.g. Google’s sponsored search, eBay auctions, electricity trading markets).</p> <p><b>Games with Perfect Information</b></p> <p>Strategic games – prisoner’s dilemma, matching pennies - Nash equilibria – theory and illustrations – Cournot and Bertrand models of oligopoly – auctions – mixed strategy equilibrium – zero-sum games – Extensive Games with Perfect Information – repeated games (prisoner’s dilemma) – subgame perfect Nash equilibrium; computational issues.</p> <p><b>Games with Imperfect Information</b></p> <p>Games with Imperfect Information – Bayesian Games – Motivational Examples – General Definitions – Information aspects – Illustrations – Extensive Games with Imperfect – Information – Strategies</p>
<p><b>Institute Level Course-1 (MIS)</b></p>	<p><b>Module 1 :</b> Introduction to Information Systems (IS): Computer Based Information Systems, Impact of IT on organizations,Importance of IS to Society. Organizational Strategy, Competitive Advantages and IS</p> <p><b>Module 2 :</b> Database and Business Intelligence:Database Approach, Big Data, Data warehouse and Data Marts Managing data resources: Establishing an information policy,ensuring data quality Business intelligence (BI): Decision Making Process, BI for Data analytics and Presenting Results</p> <p><b>Module 3 :</b> Ethical and Social Issues in Information Systems:Ethical issues and Privacy, Information Security. Threat to IS,and Security Controls</p>
<p><b>Institute Level Course-1 (CSL)</b></p>	<p><b>Module 1:</b>Introduction to Cybercrime: 1.1-Cybercrime definition, history and threats to security goals, Classifications of cybercrime, How criminal plan the attacks 1.2-The Need for an Indian Cyber Law, Introduction to Indian ITA 2000 <b>Module 2:</b> Cyber frauds and Security issues: 2.1-Social Engg, Cyber stalking, Online Drug Trafficking , Botnets, Attack vector, Credit Card Frauds in Mobile and Wireless Computing Era, 2.2:Cloud computing, Proliferation of Mobile and Wireless Devices, Trends in Mobility, work from home cybersecurity Tips and Risks, 2.3-Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Devices-Related Security Issues, Organizational Security Policies and Measures in Mobile Computing Era</p>



**Artificial Intelligence and Data Science**

	<p><b>Module 3:</b> Tools and Methods Used in Cybercrime: 3.1-Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Steganography, 3.2:DoS and DDoS Attacks, SQL Injection, Buffer OverFlow, Attacks on Wireless Networks, Identity Theft (ID Theft)</p>
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**(EXAM INCHARGE)**  
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**(H.O.D)**  
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