List of Relevant Courses Taken Outside of Formal Studies

No.	Course	Year	Instructor(s)	Short Description/ Syllabus	Resources
1	6 S191: Introduction to Deep Learning [MIT]	Dec, 2022	Alexander Amini, Ava Amini	Intensive introduction to deep learning with applications in computer vision, NLP, biology, and more. Covers foundational deep learning algorithms and practical neural network building in TensorFlow. Concludes with a project proposal competition judged by industry experts. Topics include Deep Sequence Modeling, TensorFlow, Music Generation, Deep Computer Vision, Generative Modeling, Facial Detection, Uncertainty, Bias, Reinforcement Learning, Debiasing, Robustness, Text-to-Image Generation, and Robot Learning. Prerequisites: Calculus, Linear Algebra. Python experience helpful but not required	Lecture Slides
2	CS224N: Natural Language Processing with Deep Learning [Stanford University]	Jun, 2023	Christopher Manning	Word Vectors, Word Vectors and Language Models, Backpropagation and Neural Network Basics, Dependency Parsing, Recurrent Neural Networks, Sequence to Sequence Models and Machine Translation, Transformers, Pretraining, Post-training (RLHF, SFT, DPO), Benchmarking and Evaluation, Efficient Neural Network Training, Speech Brain-Computer Interface, Reasoning and Agents, ConvNets, Tree Recursive Neural Networks and Constituency Parsing, An Introduction to Responsible NLP, NLP, linguistics, and philosophy	Lecture Slides
3	CS25: Transformers United [Stanford University]	Sep, 2023	Steven Feng, Div Garg, Emily Bunnapradist, Seonghee Lee	Introduction to NLP history, Transformer architectures, recent trends, breakthroughs, applications, challenges, and AI agents, intuitions behind language models and their implications, the history and evolution of Transformer architectures, driven by advancements in compute, Evolution of open language models, including major techniques and models like Alpaca, QLoRA, and PPO. Discussion on future trends in alignment, Introduction to Mixtral 8x7B, a Sparse Mixture of Experts (SMoE) language model. Analysis of expert routing decisions and architectural details, Enhancements to the LM learning process, introduction to Precision LMs (PLMs), and their application in resource-limited environments, ntegration of multimodal capabilities into LLMs, introduction to CogVLM, CogAgent, and discussion on research directions in multimodal models, Amortized Bayesian inference for LLMs using GFlowNets, focusing on intractable posterior distributions, and applications in multi-step reasoning, Insights into pretraining LLMs, with a focus on StarCoder for code generation. Discussion on data governance, scaling laws, and evaluation	Lecture Slides

No.	Course	Year	Instructor(s)	Short Description/ Syllabus	Resources
4	CS F441 Introduction to Computational Neuroscience [BITS Pilani(Hyderabad)]	Jul, 2024	Venkat Ramaswamy	Introduction, motivation, and syllabus overview; adaptation, change blindness, hyperbolic discounting; single neuron function, Golgi, Cajal & the Neuron doctrine, Place cells & Grid Cells; mirror neurons, "Jennifer Aniston" neurons, interface of Neuroscience ; introduction to Neuroanatomy, the mammalian visual system; neuroanatomy continued, visual system - Dorsal stream & Ventral stream; mammalian cerebral cortex, cortical wiring, cell membrane, proteins & transmembrane proteins; basic neurophysiology: Diffusion, Ion Channels, Sodium-Potassium Pump, resting potential, action potential initiation; the cell membrane as an R-C circuit, membrane equation, Nernst equation, Goldman-Hodgkin-Katz equation, cable equation; solving the membrane equation, synaptic input modeling; the squid giant axon, Hodgkin-Huxley experiments, active membrane, Hodgkin-Huxley equations; guest lecture by Aditya Asopa (NCBS) on electrophysiological methods; Leaky Integrate and Fire Neuron model, Perceptrons, Supervised Learning, Long-term Potentiation (LTP), Spike-timing Dependent Plasticity (STDP); geometry of Perceptrons, Loss functions, and energy landscapes; Perceptron Rule, Gradient Descent, Stochastic Gradient Descent; Perceptron Convergence Theorem; guest lecture by Vishnu Sreekumar (IIIT Hyderabad) on the role of context in memory; the XOR problem, Multilayer perceptrons, and error backpropagation, Introduction to Convolutional Networks	Lecture Slides