ECS405/605 : Evolutionary Intelligence

Instructors : Kushal Shah, Nagarjun Vijay, Rajakrishnan P. R.
Credits : 4 [2hr Lec + 3hr Lab]
Timings : Tue 11-12, Fri 11-12, Wed 2-5pm **Venue :** L9
Grading Scheme : 30 Mid Sem, 40 End Sem, 5 Quiz, 5 Attendance, 10 Lab, 10 Assignment

This course will expose the students to various concepts of Artificial Intelligence and its connection with evolutionary concepts in biology and linguistics.

Lecture Topics :
[Liable to change dynamically]

Topic	**Instructor**	**Dates**
Basics of cell biology, central dogma and biological evolution	NV	31/07,03/08, 07/08
Basics of information theory, entropy, complexity, randomness	KKS	10/08, 14/08, 17/08
Computation and Turing machines	KKS	21/08
Molecular evolution, and role of randomness in biological evolution (sequence, expression, traits, brownian motion models, etc)	NV	24/08, 28/08
Revision + Quiz	NV/KKS	31/08
Basics of computational linguistics	RPR	04/09
Statistics, Genetic Algorithms, Quasi-species, Turing Test, AI	KKS	07/09, 11/09, 14/09, 18/09
Mid Sem Exam		**22/09 - 30/09**
Artificial Neural Networks and other ML methods	NV	05/10, 09/10
Human Evolution and comparison to other organisms (culture, civilization, etc)	RPR/NV	12/10
Mid Sem Recess		**14/10 - 21/10**
Role of linguistics in human evolution	RPR	23/10
Language modeling, language complexity, HMMs	RPR	26/10, 30/10
Computational models of language evolution	RPR	02/11,
Revision + Quiz	PPR	06/11
Human Cognition and neuroscience	RPR	09/11

Implementation of evolutionary approaches in AI	NV/KKS	13/11, 16/11

Lab Details :

[Liable to change dynamically]

Topic	**Instructor**	**Marks**	**Date**
Python Programming - I	RPR	2	08/08
Basic DNA Sequence Analysis	NV	1	29/08
Statistical Analysis of DNA Sequence - I	KKS	1	05/09
Statistical Analysis of DNA Sequence - II	KKS	1	12/09
Python Programming - II	RPR	1	19/09
Molecular Evolutionary Model Simulation	NV	1	03/10
Biological Evolution	KKS	1	10/10
Machine Learning Toolkit	NV	1	24/10
Language Modeling	RPR	1	31/10
Buffer			14/10
	Total	**10**	

Useful Material:

Simple Programming Lessons in Hindi

Central Dogma of Molecular Biology