Teaching Plan for Next 3 Years

I believe in research through teaching and teaching through research. At IIT Mandi, I observe there are numerous opportunities for teaching and performing various teaching related experiments. Teaching is my passion and hence I am very excited to join IIT Mandi, that allowed me to teach freely. One can design M.Tech or Ph.D courses and can experiment various grading procedures including take home examination, open notes examination *e.t.c.*

Under-Graduate (UG-Level) Courses

In the past 1.5 years, I was mostly involved in teaching several undergraduate courses. I consider, teaching any under-graduate courses as a challenge as well as an opportunity to learn again that topic from scratch. Hence I always found it to be very exciting and refreshing. List of UG courses in which I was involved, is as follows :

Subject	Code	Duration	Students (Approx.)	Load (Hrs per week)
Computer Networks (CN)	CS304	Aug 2014 to Dec 2014	49	3
System Practicum (SysPrac) Lab	CS307	Aug 2014 to Dec 2014 Aug 2015 to Dec 2015	46 50	3
Data Structure Practicum (DS Lab)	IC205	Aug 2014 to Dec 2014 Aug 2015 to Dec 2015	50 112	3 3
Communicating Distributed Processes (CDP) with Lab	CS310	Feb 2015 to Jan 2015 Feb 2016 to Jan 2016	49 46	4
Design Practicum (DP) Lab	IC201P	Feb 2015 to June 2015 Feb 2016 to June 2016	12 12	3 3

Table 1: Courses Taught

Other UG-courses in which I am interested to be involved in the coming years are as follows: Algorithm designing, Theory of computation, Compiler Design, Computer Graphics. Although they are not my area of research directly but indirectly every subject is connected to others and teaching them will enable me to explore that connection and more over that subject once again.

Post-Graduate (PG-Level) Course

Apart from them I am in the process to design some specialized post-graduate courses. These courses are going to be system oriented and hence a group project and a term paper will always be included as a key component for grading. Some such courses that I am looking to design in next three years includes :

1. **Biometric Feature Extraction and Matching :** In any recognition task feature extraction and matching are two prime components. The focus of this course will be on various existing state of the art feature extraction and matching techniques. Several types of image tessellation and related features will be discussed in detail such as *gabor*, PCA, DCT, DFT, $BLPOC$ *e.t.c.* Several correlation, tracking, hamming distance *e.t.c* based matching will also be explained. Several coding assignments and projects will be given.

2. **Basic Image Processing and Computer Vision :** This course can be treated as basic initial level course for final year UG or first year PG students. In this course basics of image processing along with the computer vision will be taught. Topics like basic image structure, spatial and frequency domain filtering, line detection, point detection, circle detection, morphological operators, tracking, clustering, segmenting, object recognition $e.t.c$ will be covered.

3. **Mathematical Foundation for Biometric based Systems :** In this course I will try to lay a foundation of basic mathematical structures required for biometric based systems. Topics such as basic linear algebra, eigen-value an vector, SVD decomposition, probability distributions and some machine learning techniques such as Bayesian Classification, Gaussian Mixture Model GMM, Hidden Markov model HMM, Support Vector Machine SVM, $K - means$ clustering will be discussed. Several coding assignments and projects will be given.

4. **Computer Vision Techniques for Biometric Recognition :** Several computer vision algorithms can be used for performing some basic biometric recognition tasks. Such algorithms will be covered in this course. Algorithms for tracking, clustering, segmenting, object recognition $e.t.c$ will be taught as well as programing assignment and well project activities involving them will be conducted.