Minor in Data Science and Artificial Intelligence

Motivation:

The art of finding patterns in data to make intelligent decisions is predicted to make the next big industrial revolution. There is a great push from the Government of India to include courses relevant to data science, AI, and Machine Learning (ML) as early as possible in the education system. Also, it has become increasingly necessary for students in engineering courses to understand the art and science of finding patterns in data. Therefore, any interested student, regardless of the branch in which he/she is studying, should be allowed to opt for courses related to AI and Data Science and obtain a minor degree. Towards this, IIT Dharwad has started a minor with the following basic requirements.

1. A minimum of 30 credits needs to be obtained by taking courses in AI and data science basket. These 30 credits should be in addition to the credits that he/she earns to get the B. Tech/ BS-MS degree.

2. Students interested in this minor are required to take mandatory/core courses. To complete the credits requirements for minors, students need to choose among the electives listed in this document.

3. The core courses that need to be completed have 12 credits and they are independent of their branch.

4. The total credit requirement that needs to be completed through electives/Project is 18 credits.

5. The choice of elective courses depends on the branch in which he/she is studying.

6. Within the 18 credits for the elective, the students can complete a project in AI/ML/DS with 6 credits or a mini project with 3 credits with suitable approval from the dean academic.

7. The core CSE students cannot opt for a Minor in Data Science and Artificial Intelligence, instead they will be awarded a B.Tech. (Hons.) if they complete the prescribed list of courses in Data Science and Artificial Intelligence in addition to the credits needed for the B. Tech. degree.

8. The students in the program B.Tech. in Mathematics and Computing who wish to take a minor in DSAI should take the course Pattern Recognition and ML (PRML) or Natural Language Processing (NLP) in lieu of this Mathematics for Data Sciences.

The following section describes the list of courses and guidelines on how to take these courses to obtain the minor.

List of Courses and Guidelines

List of mandatory courses is given below:

Sl. No	Course (Mandatory)	Semester	Credits
1	Mathematics of Data Science	3rd Semester (odd Semester)	6
2	Probability models and its applications	3rd Semester (odd Semester)	6

After finishing the mandatory course(s), the students are required to take electives in the subsequent semesters. The non-CS students can opt for AI and Lab as one of the electives. Since CS students credit AI and Lab as core courses it cannot be utilized in their credit requirements for minor completion.

List of electives is provided below:

Course name	Credits	Semester
Pattern Recognition and ML (PRML)	6	Odd
PRML Lab	3	Odd
Neural Networks and Deep Learning (NNDL)	6	Even
NNDL Lab	3	Even
Reinforcement Learning (RL)	6	Odd/Even
RL lab	3	Odd/Even
Statistical Pattern Recognition (SPR)	6	Odd/Even
SPR Lab	3	Odd/Even
Speech Processing (SP)	6	Odd/Even
SP Lab	3	Odd/Even
Advanced Topics in Speech Processing	6	Odd/Even
Project/Mini Project in ML	3-Jun	Odd/Even
Natural Language Processing	6	Odd/Even

Note: It is good to have a background in Data structures and Algorithms and Programming in Python. This can be done by taking online courses or through self-reading exercises. No credits will be provided for this!