

Minor in Smart Systems

Motivation:

With the evolution of the Internet of Things (IoT), smart systems play a vital role in multiple fields, such as Industrial IoT (IIoT), networked control systems (NCS), robotics and automation, etc. In fact, the industrial processes are evolving into Industry 4.0, envisioning a variety of applications like smart manufacturing, smart supply chain management, distributed processing and decision making, etc. The objective of this minor in Smart Systems is to prepare the students to be “ready” for the industry of the future. Therefore, any interested student, regardless of the branch in which he/she is studying should be given the opportunity to opt for courses related to smart systems and obtain a minor degree. Towards this, IIT Dharwad has decided to start this minor with the following basic requirements:

1. A minimum of 24 credits needs to be obtained by taking courses in the “Smart Systems” basket. These 24 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 a few mandatory courses listed in this document. The courses depend on the branch in which he/she is studying.

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

List of Courses and Guidelines

The following are the mandatory courses that need to be taken by students from 3rd semester onwards.

Branch	Courses (mandatory)	Semester	Credits
Computer Science Electrical Engineering Mechanical Engineering	Introduction to Industry 4.0 and Industrial Internet of Things (IIoT)	5 th Semester (odd semester)	6
	Smart Systems Design Lab	6 th or 8 th Semester (even semester)	6

The CS/EE/ME students are required to take at least 12 credits through electives from the pool of electives deemed as Smart Systems courses. The list is provided below.

Course Name	Credits	Semester
Mathematics of Data Science	6	Odd
Pattern Recognition and ML (PRML)	6 + 3	Even
Operational Analysis	6	Odd
Robotics and Automation	8	Odd
Smart Manufacturing	6	Even

If one wishes to obtain more knowledge in the field of Smart Systems, apart from taking up courses that will fetch him/her a minor in Smart Systems, he/she can opt for relevant courses in this area as a part of the regular institute/Dept. electives. An example set of courses is provided below for each department which will serve as a guideline for students. Note that the overall number of credits is approximately 62 including electives + minor. The red color indicates the courses that one needs to take to complete the minor requirement.

CS/EE Students

Course name	Credits	Semester
Mathematics of Data Science	6	3 rd Semester
Introduction to Industry 4.0 and Industrial Internet of Things (IIoT)	6	5 th Semester
Pattern Recognition and ML (PRML)	6 + 3	6 th Semester
Smart Systems Design Lab	6	6 th or 8 th Semester
Operations Analysis	6	7 th Semester
Robotics and Automation	8	7 th Semester
Neural Networks and Deep Learning	6 + 3	8 th Semester
BTP related to Smart Systems	6 + 6	Final year

Note: For ME students, the total number of credits is approximately equal to 59 as opposed to CS students.

ME Students

Course name	Credits	Semester
Mathematics of Data Science	6	3 rd Semester
Introduction to Industry 4.0 and Industrial Internet of Things (IIoT)	6	5 th Semester
Smart Manufacturing	6	6 th Semester
Smart Systems Design Lab	6	6 th or 8 th Semester
Operations Analysis	6	7 th Semester
Robotics and Automation	8	7 th Semester
Pattern Recognition and ML (PRML) or Neural Networks and Deep Learning	6 + 3	8 th Semester
BTP related to Smart Systems	6 + 6	Final year