Core Courses

DSS5101 Principles of Sustainability
This course provides a comprehensive understanding of sustainability, including the science of sustainability, the limits of growth, and the interdependence of natural systems. Students will learn about different frameworks for understanding sustainability, including the three pillars of sustainability (economic, environmental, and social), the planetary boundaries approach, and the United Nations Sustainable Development Goals (SDGs).

DSS5102 Advanced Regression and Time Series Analysis
In this course, students will learn how to fit regression models and time series models to data, with a focus on applications in sustainability research. Topics will include generalized linear models, including mixed-effects models, nonparametric regression techniques such as splines and local regression, time series models such as autoregressive integrated moving average (ARIMA) models, vector autoregression (VAR) models, and state-space models, bootstrap methods, cross-validation, model selection and model averaging. Furthermore, the course will explore case studies where regression and time series models have been used to address sustainability challenges such as energy consumption and greenhouse gas emissions.

DSS5103 Geospatial Data Analysis
This course will provide students with the skills and knowledge to analyse and manage large spatial data sets and to create and apply spatial models for environmental and sustainability research. Through hands-on exercises and projects, students will learn how to analyse and model geospatial data, with an emphasis on data related to sustainability challenges.

DSS5104 Machine Learning and Predictive Modelling
This course focuses on teaching students how to apply a range of machine learning techniques to sustainability data. Students will learn how to build and evaluate models using decision trees, neural networks, and other machine learning methods. They will also gain an understanding of statistical aspects of machine learning, such as regularization and cross-validation, that are relevant to building effective models. Through hands-on projects, students will have the opportunity to apply machine learning methods to sustainability challenges. This course aims to provide students with a solid foundation in machine learning and its applications in sustainability.

DSS5201 Data Visualisation
This course provides an introduction to the field of data visualisation, a crucial instrument in the data science industry. It equips students with the skills necessary to transform raw data into meaningful information by employing statistical tools and creating visual representations. The course is taught using relevant statistical software and covers topics including data import, cleaning, manipulation, exploration, and visualisation. The course emphasizes on developing skills in critically evaluating visual displays of data, ensuring a thorough understanding of data visualisation.

Elective Courses

DSS5105 Data Science Projects in Practice
In today's corporate environment, data-related roles in a company require the individual to do more than just machine learning. For instance, data scientists are required to collaborate closely with engineers, to understand the pipeline that data flows through, and to communicate their work to both end-users and higher management. This course will focus on these particular aspects of a data science project, rather than model development and model accuracy. Through a realistic project framework, students will journey through the data science lifecycle. Throughout the project, the emphasis will be on collaboration, project management and delivery of a practical solution to a specified end-user.

DSS5202 Sustainable System Analysis
This course equips students with the skills and knowledge to analyse and assess system sustainability using various tools such as life cycle analysis, input-output analysis, and multi-criteria decision analysis. It covers the evaluation of environmental impacts, effectiveness of sustainability policies and technologies, and designing sustainable solutions in areas like energy, transportation, agriculture, and waste management. Students will learn to conduct environmental impact assessments, identify sustainability risks, and develop practical solutions considering stakeholder perspectives. The course emphasizes practical applications and real-world case studies to provide hands-on experience in sustainability analysis and evaluation.

DSS5203 ESG Data for Sustainable Finance and Investments
This course provides students with a practical understanding of the various types of ESG data, how it is constructed and used within the banking, asset ownership and asset management industries. Students will learn constraints and opportunities presented in the use of ESG scores, climate and other raw ESG data constructs for financing, risk assessment, regulatory applications as well as private and public market investing strategies. Real-world examples and course assessments will be used to highlight the challenges/ opportunities of applying ESG data to various markets, and the real-market interplay between corporates, financial institutes, data providers and regulators.

DSS5210 Research/Industry Project I
In this course, students will refine their data science abilities by engaging in a sustainability-focused research project or industry attachment. They will gain hands-on experience, confronting real-world challenges associated with practical data science projects. This course can be pursued independently or coupled with DSS5211 for a more extensive commitment. Students are required to dedicate a minimum of 120 hours towards their project or industry attachment.

DSS5211 Research/Industry Project II
In this course, students will refine their data science abilities by engaging in a sustainability-focused research project or industry attachment. They will gain hands-on experience, confronting real-world challenges associated with practical data science projects. This course can be pursued independently or coupled with DSS5210 for a more extensive commitment. Students are required to dedicate a minimum of 120 hours towards their project or industry attachment.