**GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY
SRI LANKA**

Course Handbook
2024

Bachelor of Science in Applied Data Science Communication

About this document

Bachelor of Science in Applied Data Science Communication is an innovative interdisciplinary programme hosted by the Department of Languages, Faculty of Management, Social Sciences and Humanities of General Sir John Kotelawala Defence University. This document includes a broad outline of the structure and the content of the programme.

Cover photo: Squadron Leader Rakhitha Wickramaratne (KDU Intake 22)

DEPARTMENT OF LANGUAGES
FACULTY OF MANAGEMENT, SOCIAL SCIENCES & HUMANITIES

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University Vision

To be a university nationally and internationally known for its unique ability to engage both undergraduate and graduate students in distinctive and interdisciplinary defence related higher education that best serves the tri-services, the state sector and society at large.

University Mission

To ensure a high-quality, learner-centered educational experience through undergraduate, graduate, and professional programmes along with high quality research across many disciplines in the field of defence, in both residential and non-residential settings in the campus.

Faculty Mission

To facilitate to accomplish the academic excellence in management, social sciences and humanities by offering lectures, research guidance and other learner centred educational activities to undergraduates, graduates and professionals in the field.

A brief introduction to the university

General Sir John Kotelawala Defence University (KDU) was initially established as the "General Sir John Kotelawala Defence Academy" by the Parliamentary Act No 68 of 1981 and subsequently elevated to University status by the Amendment Act No 27 of 1988. KDU is located at the Kandawala Estate in Ratmalana, which was donated by the late General Sir John Kotelawala. The faculties atKDU include the Defence and Strategic studies, Law, Management, Social Sciences and Humanities, Engineering, Medicine, Allied Health Sciences and Graduate Studies.

A brief introduction to the Faculty of Management Social Sciences & Humanities (FMSH)

Faculty of Management, Social Sciences and Humanities has been established under the restructuring program of the General Sir John Kotelawala Defence University. It consists of three departments namely Department of Management and Finance, Department of Social Sciences and Department of Languages.

A brief introduction to the Department of Languages

Department of Languages conducts language courses for both undergraduate and postgraduate students who enroll for various programmes. This includes running English for Academic Purposes programmes, English for Specific Purposes programmes and general English courses. It also offers communication skills courses for students and professionals.

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1. Basic information

1.1 Programme name

Applied Data Science Communication

1.2 Award Title

Bachelor of Science in Applied Data Science Communication

1.3 Award title abbreviation

BSc

1.4 Awarding body

General Sir John Kotelawala Defence University, Sri Lanka

1.5 Level of qualification

Level 5 of the Sri Lanka Qualification Framework

1.6 Number of overall credits

Total = 90
- Year 1 – 32
- Year 2 – 32
- Year 3 – 26

1.7 Language of study

English

1.8 Mode of study

A blend of on campus face-to-face and online modes.

1.9 Duration

Full time: Three years full-time (6 semesters)

1.10 Overall Structure

The programme runs under four themes: Mathematics/Statistics, Computer Science, Economics/Accounting and Finance/Management and Communication. Each theme carries equal weight.

1.11 Entry requirements

1.11.1 Sri Lankan nationals

Those wish to join the programme should possess minimum qualifications required to enter a university in Sri Lanka.

Minimum requirement:

- G.C.E. (Advanced Level) –Three Simple Passes (S) in Mathematics, Bio Science, Commerce or Technology streams, or those who have taken Economics or Statistics in the Arts stream,
- pass in the Common General Test
- at least a Credit pass for English and Mathematics in the G.C.E. (O/L) examination (or equivalent, e.g. London O/L, Cambridge FCE/CAE/CPE/BEC).

Equivalent qualifications to G.C.E. (A/L) (E.g. Cambridge or Edexcel) are also considered.

1.11.2 Foreign nationals

Foreign nationals who wish to join the programme should possess qualifications equivalent to G.C.E. (Advanced Level)[1] indicated above – (please see *1.11.1* for the entry requirements for Sri Lankan nationals).

They should possess a qualification equal to G.C.E. (A/L) in one of the following subject streams: Mathematics, Biology, Commerce, Technology, Arts (with Economics and/or Statistics)

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[1] G.C.E. (Advanced Level) is at Level 2 of the Sri Lanka Qualification Framework

2. Rationale

Bachelor of Science in Applied Data Science Communication is an innovative interdisciplinary degree course designed by academics and industry experts and hosted by the Department of Languages of the Faculty of Management Social Sciences and Humanities.

According to industry experts, data storytelling is an art that most experts in the computer field and business fields are unable to perform. The hard-core data scientists may also be unable to communicate the data they analyse although they are good in data analytics. Therefore, there is a void for effective communicators of data. Thus, the organisations are now seeking for individuals with interdisciplinary knowledge who are better communicators. This BSc in Applied Data Science Communication course goes beyond data science. Students will gain an understanding of key concepts in data science, economics, accounting, finance, management and communication.

An effective data storyteller needs knowledge on extracting data from available data sources, understanding how to analyse the existing data and how to visualize and communicate the data effectively. In doing so, they need to work with government and private sector organisations and understand how organisations function.

The students on the course will be able to understand how organisations work through the knowledge and skills gained by learning basic concepts in economics, accounting, finance and management. They will then be able to extract data from databases in different organisations using their knowledge and skills in computer science, analyse the extracted data applying their knowledge and skills in statistics and present the analysis to any stipulated audience effectively applying their knowledge and skills in communication. In doing so, they will be able to adhere to professional ethics and data protection regulations.

Through the interdisciplinary knowledge gained on the course, the graduates of this programme will be able to serve various sectors including government and private organisations.

Bachelor of Science in Applied Data Science Communication programme of KDU has been designed in accordance with international standards and the requirements of Sri Lanka Qualifications Framework.

3. Graduate profile

A graduate of Bachelor of Science in Applied Data Science Communication will be an autonomous, independent, resourceful, creative and socially responsible team worker who possesses knowledge and skills related to data science tools, economics, finance, accounting, management and communication. The graduate is capable of identifying, generating, extracting and analysing data and presenting them to technical and non-technical audiences persuasively. In doing so, they will adhere to professional and social ethics and demonstrate positive attitudes towards the profession and society.

4. Programme objectives

This qualification equips students with the fundamental theoretical concepts and practical skills necessary to explore and analyse data sets in different organisations, solve problems using data science tools and present them effectively. The programme aims to:

1. develop knowledge and skills in fundamental principles of data science, economics, finance, management and communication in order to produce data storytellers.
2. facilitate access to hands on experience of real-world applications related to the content they learn on the degree programme in various organisations.
3. provide the opportunity to work with different organisations to establish themselves as future employees within organisations.
4. provide opportunities to develop advanced communication skills.
5. develop 21st century skills such as critical thinking, problem solving, and communication needed for their profession.
6. develop positive attitudes, social skills and professional ethics with an awareness on data privacy and data security needed in the profession.
7. help developing learner autonomy to be independent professionals and life long learners.

5. Intended learning outcomes (ILOs)

After completing the Bachelor of Science in Applied Data Science Communication degree, a graduate should be able to:

1. demonstrate knowledge of concepts and principles of data science tools.

2. demonstrate knowledge of concepts and principles of databases, computer programming languages, data analytics and data visualization for data communication purposes.

3. demonstrate knowledge of introductory concepts in the discipline of economics, accounting, finance and management for data communication.

4. demonstrate knowledge of fundamental principles of oral and written data storytelling.

5. demonstrate a high level of creativity and critical judgement in identifying, analysing and solving problems related to various types of organisations using data science tools.

6. apply data science knowledge in assisting both the government and private sector in order to achieve Sustainable Development Goals 2030.

7. propose, plan, execute and evaluate a significant piece of a blended original research and practical work.

8. engage in effective teamwork and take initiatives in order to fulfil the academic and professional needs and demonstrate leadership qualities and personal responsibility in tasks assigned either in their professional or in social life.

9. build strong professional and social networks which are essential for the profession and demonstrate social skills needed in both the profession and social life.

10. demonstrate positive attitudes towards the profession, give importance to professional and social ethics and maintain a high standard of professionalism.

11. develop a long-term goal of being an expert in Applied Data Science Communication not only in Sri Lanka but globally.

12. undertake further training and develop additional skills that will enable them to regularly update their knowledge and skills in the profession and to be autonomous learners.

6. Learning, teaching and assessment strategies

An integrated module delivery system will take place. For example, students will learn some concepts in economics (Theme 3), then extract a data set from an organization (using the tools that they get exposed to under Theme 2), analyse the data set (using the knowledge gained in Theme 1) and present the outcome (Theme 4).

6.1 Learning

- Students will be given an induction on learning content of the programme. This will make them prepare for study, learning environment and learning systems.
- Students will have access to an online learning system with tools available to monitor the progress and assess the achievement of learning outcomes.
- Students will be exposed to a range of learning situations including individual, peer and group learning, on-site and online learning, problem-based learning and individual autonomous learning.

6.2 Teaching

- Classroom teaching will take place at the University premises. This will be delivered through innovative teaching and learning mechanisms including active and collaborative group work, agile problem and scenario-based learning, mini assignments etc. delivered in an authentic student centric learning environment.
  Different teaching styles will be used including:

Lectures
- Lectures will introduce ideas and stimulate group discussions. Some of the lectures will be delivered online via virtual learning environment tools.

Tutorials
- Tutorials will develop students' ability to create problem-solving strategies and provide practice and feedback with scenarios to help with exam preparation.

Practical workshops/Laboratory activities
- Workshops will develop students' expertise in various software and programming tools, using analysis of complex datasets, their communication ability and application of theory in practical situations.

Seminars

- External speakers from multinational organisations and local companies will deliver seminars to complement students' learning and provide real-world case studies related to their studies.

6.3 Assessment

- Students will be assessed using a range of methods. This will include continuous assessment and module end assessments.
- Tutor feedback and peer feedback will be given regularly on formative assessments.
- Students will be made aware of the assessment criteria in the induction.
- Students will be given the opportunity to evaluate their own performance based on the assessment criteria.

7. Assessment

In all modules, equal time is allocated for theory and practice. Therefore, equal weight is given to theory and practice in assessments.

Summative:
1. Practical assignments (50%) will include:
    - quizzes
    - short writing tasks
    - presentations
    - one minutes papers
    - jigsaw tasks
    - memory matrix
    - quiz shows
    - concept mappings
    - critiquing short research articles
    - critiquing short data presentations
    - critiquing oral presentations
    - presentations using different modes
    - podcasts
    - data presentations tasks

2. Module end examination (50%): Each semester will comprise a semester end examination, which will assess understanding of theoretical aspects of the modules. Type of questions include:

- Multiple choice questions
- Short answer questions
- Long answer questions
- Reading comprehension tasks
- Listening comprehension tasks
- Critiquing abstracts
- Critiquing data stories

Formative:

In each module, formative tasks will be given, e.g. short essay. Students will get both tutor and peer feedback for these.

8. Employment

Demand for data scientists outstrips supply and there is continued demand for qualified, talented graduates across many global industries. World Economic Forum Report (2018) aims to unpack and provide specific information on the relative magnitude of the trends by industry and geography and highlights the industries where data science is a grave demand. This includes almost all sectors ranging from aerospace to heath to agriculture. With this qualification, students will be equipped with the skill set and technical knowledge relevant for the data science and big data job market. Some potential jobs include:

- Data Analysist
- Business Intelligence Developer
- Data Engineer
- Business Analysist
- Data Scientist
- Database Developer

Link to the World Economic Forum Report (2018):
http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf

9. Industrial training and dissertation

After successful completion of taught modules, each student will be offered the opportunity of an industry-sponsored live project/dissertation. This will provide the students with practical experience in an area directly relevant to their degree under the supervision of the host organisation alongside an academic supervisor from KDU. It enables the student to integrate and reflect upon their study in previous modules and develop their knowledge and skills.

10. Programme structure

10.1 Programme themes

The programme is structured under four themes.

1. Statistics

   Statistics theme aims to provide fundamentals of mathematical and statistical concepts underpinning data science.

2. Computer science

   Computer science theme aims to provide fundamental programming concepts required to use data science tools.

3. Economics, finance, accounting and management

   This theme provides an introduction to the discipline of economics, accounting and finance and management required to understand how organisations work, the type of data available in them and how to handle their data.

4. Communication

   Data storytelling is a novel art which needs effective communication skills. The aim of this theme is to develop necessary skills to be effective data communicators who can use communication tools to effectively tell data stories to stakeholders and diverse audiences and thereby support their decision making.

10.2 Programme content

Semester	Course code	Course name	Credit value	Status (Core /Optional)
1	LB 1114	Fundamentals of mathematics	4	C
	LB 1124	Fundamentals of programming with R	4	C
	MF 1134	Business economics	4	C
	LB 1144	Effective presentation skills	4	C
2	LB 1214	Fundamentals of statistics	4	C
	LB 1224	SQL for data science	4	C
	MF 1234	Essence of management and organizational behaviour	4	C
	LB 1244	Citizen science and communication	4	C
3	LB 2114	Fundamentals of data mining	4	C
	LB 2124	Programming with Python	4	C
	MF 2134	Accounting and finance	4	C
	LB 2144	Effective writing skills	4	C
4	LB 2214	Applied machine learning	4	C
	LB 2224	Advanced SQL and Cloud Databases	4	C
	MF 2234	Operations management	4	C
	LB 2244	Research methods and research presentations	4	C
5	LB 3114	Data science applications and artificial intelligence	4	C
	LB 3124	Data visualization and storytelling	4	C
	MF 3134	Policy analysis	4	C
	LB 3144	Corpus analysis and data presentation	4	C
6	LB 3216	Industry sponsored dissertation	6	C
	LB 3224	Industrial training	4	C

10.3 Overall credit breakdown

Year	Semester	Number of modules	Number of credits per module	Total
1	1	4	4	16
	2	4	4	16
2	1	4	4	16
	2	4	4	16
3	1	4	4	16
	2	2	4 & 6	10
Total				90

11. Module details

Semester 1			
Course Code:	LB 1114		
Course Name:	Fundamentals of mathematics		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

This module provides students with a foundation in fundamentals of mathematics necessary to understand calculus and algebra for data science.

After completion of this module, students will be able to:
- apply core calculus for data science
- apply matrix algebra for data science
- apply implementation of matrix and calculus in R programming language

Course Content: (Main topics, Sub topics)
- Systems of linear equations
- Set theory
- Graph theory
- Counting techniques
- Boolean algebra
- Logic gates
- Fundamentals of calculus
    - Differentiation
    - Integration
- Vectors algebra
- Matrix algebra
    - Definition
    - Additional and multiplication
    - Transpose
    - Determinants
    - Inverse
    - Singular matrix
- Implementation of matrix and calculus in R programming language

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	Final Assessment 50 %	
	Theory (%)	**Practical (%)**
Practical tasks	25%	25%

Recommended Reading:
- Michael J. Crawley (2012). The R Book, A Wiley Brand.

Semester 1			
Course Code:	LB 1124		
Course Name:	Fundamentals of Programming with R		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

In this module, we aim to provide fundamental skills in using the latest version of R programming language for data science.

After completion of this module, students will be able to:
- express fundamental programming concepts.
- write clean and concise code with R.
- explore data with R.
- process data with R.

Course Content: (Main topics, Sub topics)
- Introduction to programming
- Core Programming Principles
- Variables and Data Types
- Operations and Operator Precedence
- System Functions
- User define function
- Conditional operations and Loops
- Data Frames
- Data import and export
- Data processing with R libraries

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	Final Assessment 50 %	
Practical tasks	**Theory (%)** 25%	**Practical (%)** 25%

Recommended Reading:
- Vries, A. D., & Meys, J. (2015). R for dummies. Hoboken: J. Wiley & Sons.
- Crawley, M. J. (2015). The R book. Chichester: Wiley.

Semester 1	
Course Code:	MF 1134
Course Name:	Business Economics
Credit Value:	4
Core/Optional	Core

Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

The aim of this module is to provide a thorough introduction to the discipline of Economics. The module is divided into two parts and in the first part, the course will cover microeconomic analysis, including the theory of demand, costs and pricing under various forms of industrial organisation, and welfare economics. The second part focuses on macroeconomic analysis and will include national income analysis, monetary theory, business cycles, inflation, unemployment, and the great macroeconomic debates.

After completion of this module, students will be able to:
- express theory of demand, costs and pricing under various forms of industrial organisation, and welfare economics.
- follow national income analysis, monetary theory, business cycles, inflation, unemployment, and great macroeconomic debates.

Course Content: (Main topics, Sub topics)
> *Micro*
- The Fundamentals of Managerial Economics
- Market Forces: Demand and Supply
- Quantitative Demand Analysis
- The Theory of Individual Behaviour
- The Production Process and Costs
- The Organisation of the Firm
- The Nature of Industry
- Managing in Competitive, Monopolistic, and Monopolistically Competitive Markets
> *Macro*
- Macroeconomic Concepts and Indicators
- Aggregate Demand
- Monetary Policy and Aggregate Demand
- Fiscal Policy and Aggregate Demand
- Monetary and Fiscal Policy in the Long Run
- Economic Growth
- International Trade, Exchange Rates, Capital Flows, Free Trade and Protectionism

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	Final Assessment 50 %	
	Theory (%)	**Practical (%)**
Practical tasks	25%	25%

Recommended Reading:
- Michael Baye and Jeff Prince (2017). *Managerial Economics & Business Strategy*.
- Andreas Hauskrecht, Jürgen von Hagen, and Lawrence S. Davidson *Macroeconomics for Business: The Manager's Way of Understanding the Global Economy*

Semester 1			
Course Code:	LB 1144		
Course Name:	Effective presentation skills		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

The aim of this module is to provide students with understanding of presentation skills needed for data storytelling. It focuses not only on verbal communication, but also on non-verbal communication, cultural aspects related to communication and how data visualization can make a significant change into communication.

After completion of this module, students will be able to:
- use diverse presentation tools.
- do effective presentations applying the presentation skills learned
- analyse features of data stories in different disciplines
- analyse barriers to data communication in a range of contexts and propose solutions

Course Content: (Main topics, Sub topics)
- Verbal and non-verbal communication
- Presentation skills
- Diverse presentation tools
- Visualisation ethics
- Visualisation for communication
- Concepts of photography and videography
- Multimedia editing and animations
- Analysing features of data stories (genre analysis)
- Communication barriers and overcoming them

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	Final Assessment 50 %	
Practical tasks	**Theory (%)** 25%	**Practical (%)** 25%

Recommended Reading:
- Dykes, B. (2020). Effective data storytelling. Hoboken, New Jersey: Wiley.
- Cenere, P. (2015). *Communication skills for business professionals.* Port Melbourne, Vic.: Cambridge University Press.
- Barker, A. (2013). *Improve your communication skills* (3rd ed., Creating success). Philadelphia,

Pa.: Kogan Page.
- Riche, N., Hurter, C., Diakopoulos, N., & Carpendale, S., (Eds.) (2018). *Data-driven storytelling*. Boca Raton: CRC Press.

Semester 2			
Course Code:	LB 1214		
Course Name:	Fundamentals of Statistics		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

This module provides students with a foundation in basic statistics and probability. The module lays foundations for data analysis.

After completion of this module, students will be able to:
- apply data summarization techniques.
- apply probability concepts.
- apply probability distribution functions.
- assess relationship between variables.
- apply hypothesis testing.

Course Content: (Main topics, Sub topics)
- Introduction to statistics
- Types of data and data summarization
- Introduction to probability
- Introduction to probability distribution functions
- Hypothesis testing
- Assessing relationship between variables
- Linear models
- Generalized linear models

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	Final Assessment 50 %	
	Theory (%)	**Practical (%)**
Practical tasks	25%	25%

Recommended Reading:
- Peter J. Diggle and Amanda G. Chetwynd (2011). Statistics and Scientific Method: An Introduction for Students and Researcher

Semester 2			
Course Code:	LB 1224		
Course Name:	SQL for data science		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

The aim of this module is to provide students the foundational concepts of databases and SQL (Structured Query Language).

After completion of this module, students will be able to:
- design a database.
- create databases and schemas in SQL Server and query records using T-SQL.
- explore various techniques to retrieve data from multiple tables.
- create tables, views and stored procedures and query multiple tables by using joins.
- add, update, and delete data in the SQL server databases and join, filter, group, and sort results.

Course Content: (Main topics, Sub topics)
- Introduction to Databases and Database Schemas
- Database designing
- Introduction to SQL and T-SQL
- Creating Database Objects
- SQL Data Types
- Inserting, updating, and deleting data
- Data filtering and sorting
- Views and Stored procedures
- System Functions and User Defend Functions
- SQL Joins

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %		Final Assessment 50 %	
Practical tasks		**Theory (%)**	**Practical (%)**
		25%	25%

Recommended Reading:
- Ben-Gan, I. (2016). T-Sql fundamentals. Redmond, WA: Microsoft.
- Sarka, D., Ben-Gan, I., & Talmage, R. (2014). Querying Microsoft Sql Server 2012: Exam 70-461, Training kit. Etats-Unis: Solid Quality Global SL.

Semester 2			
Course Code:	MF 1234		
Course Name:	Essence of Management and Organizational Behavior		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

The aim of this module is to provide an understanding of the essential components of how organisations behave and how to manage them. The four essential components of management, i.e. planning, organizing, leading and controlling are covered in the content.

After completion of this module, students will be able to:
- identify main features of an organization, and how organisations behave and organsations' relationships with external bodies
- identify the factors that govern organisations and the behaviour of managers
- examine how decision making happens within an organization
- examine how organizational problems are identified and the process of conflict resolution and negotiation
- Identify the learnership styles

Course Content: (Main topics, Sub topics)

Management
- Introduction to Management in an organization
- The evolution of management theory
- Organizational environment
- Planning & Decision Making
- Strategic management
- Organizing
- Human resource management and Motivation
- Leadership
- Controlling
- Managerial ethics

Organizational Behavior
- Organizational Behavior and its importance
- Individual differences and Emotions
- Social perception and Managing Diversity
- Groups and teams
- Managing conflict and negotiation
- Decision making and creativity
- Organizational development

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and

activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	Final Assessment 50 %	
	Theory (%)	**Practical (%)**
Practical tasks	25%	25%

Recommended Reading:
- Hitt, M., Black, Stewart, author, & Porter, Lyman W., author. (2014). *Management* (Third edition, Pearson new international ed., Pearson custom library). Harlow : Pearson.
- Mullins, L. J. (2016). *Management and Organisational Behaviour* (Eleventh ed.). Harlow, United Kingdom: Pearson Education Limited.

Semester 2			
Course Code:	LB 1244		
Course Name:	Citizen science and communication		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

The aim of this module is to introduce the concept of citizen science and the importance of effective communication in citizen science projects. This explores the possibility of how people who are not data scientist can use data science tools and techniques to improve the use of information in their respective fields. The module will discuss aspects such as open science, participatory science, citizen science in the digital age etc. Students will also learn the basics of designing citizen science projects and how effective communication is crucial in citizen science projects.

After completion of this module, students will be able to:
- apply the basic principles of citizen science in evaluating citizen science projects
- use effective communication techniques to communicate with diverse audiences
- accurately communicate rules and regulations involved in ethics and data protection
- plan and execute a citizen science project

Course Content: (Main topics, Sub topics)
- Introduction to citizen science
- Information for and by the people: The Internet
- Effective communication with citizens
- Participation and community engagement
- Using diverse communication channels
- Ethical considerations and communicating ethical information
- Privacy and ownership of data and communicating these to different audiences
- General Data Protection Regulations (GDPR)
- Personal data protection act
- Designing citizen science projects

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	Final Assessment 50 %	
	Theory (%)	**Practical (%)**
Practical tasks	25%	25%

Recommended Reading:
- Hoffman, C., Cooper, C., & Cavalier, D. (2020). The Field Guide to Citizen Science. North Adams: Timber Press, Incorporated.
- Wynn, J. (2017). Citizen Science in the Digital Age (Albma Rhetoric Cult & Soc Crit). Alabama: The University of Alabama Press.

Semester 3			
Course Code:	LB 2114		
Course Name:	Fundamentals of Data Mining		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

This module provides students with data mining and predictive modelling concepts including clustering, classification and association rule mining techniques.

After completion of this module, students will be able to:
- examine core data mining concepts
- examine data mining process and standards
- learn key differences between supervised and unsupervised learning techniques
- apply data mining concepts in real-world problems
- create prediction models
- perform data mining in practical terms, using a wide variety of R libraries and techniques

Course Content: (Main topics, Sub topics)
- Introduction to data mining
- Data mining process and standards
- Cross-industry standard process for data mining
- Fundamentals of Supervised Learning Algorithms
- Model training, testing, and evaluation
- Fundamentals of unsupervised Learning Algorithms
- Market Basket Analysis Using Association Rules
- Clustering
- Text mining
- Sentimental Analysis

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	Final Assessment 50 %	
Practical tasks	**Theory (%)**	**Practical (%)**
	25%	25%

Recommended Reading:
- Brown, M. S. (2014). Data mining for dummies®. Hoboken, NJ: For Dummies®, A Wiley Brand.

- Provost, F., & Fawcett, T. (2013). Data science for business: what you need to know about data mining and data-analytic thinking. Sebastopol: OReilly.
- Lantz, B. (2019). Machine learning with R: expert techniques for predictive modeling. Birmingham: Packt Publishing.

Semester 3			
Course Code:	LB 2124		
Course Name:	Programming with Python		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

Python programming is one of the most demanded skill sets in today's job market. In this module, we aim to provide fundamental skills in Python language.

After completion of this module, students will be able to:

- implement basic Python code.
- input and output data from a variety of data types.
- load data from files or from internet sources.
- implement data engineering techniques.
- combine, manipulate and visualize complex dataset.
- automate essential tasks with Python scripts.

Course Content: (Main topics, Sub topics)
- Introduction to Python programming
- Variables and Data Types
- Operations and Operator Precedence
- System and User Defined Functions
- Conditional operations and Loops
- Data Frames
- Data import and export with Python
- Data Manipulation with Python
- Data Wrangling

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	**Final Assessment** 50 %	
Practical tasks	Theory (%) 25%	Practical (%) 25%

Recommended Reading:
- Overland, B. R. I. A. N. (2019). Advanced Python Programming. Place of publication not identified: Addison-Wesley.
- McKinney, W. (2018). Python for data analysis: data wrangling with pandas, NumPy, and IPython. Sebastopol, CA: OReilly Media, Inc.

Semester 3			
Course Code:	MF 2134		
Course Name:	Accounting and Finance		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

This is an introductory course in accounting and finance. The first part of the course will provide an introduction to financial accounting concepts and financial reporting, with the focus being on how decision makers analyse, interpret, and use accounting information. Emphasis is given to how accounting measures, records, and reports economic activities for corporations and on the relationship between accrual and cash flow measures in interpreting accounting information.

In the second part, students learn how to value assets and businesses given forecasts of future cash flows. The course also concentrates on the risk characteristics of different asset classes. The course focuses on stocks, bonds and interest rates in addition to measuring and pricing risk. Further, the course introduces students to valuation and derivative instruments. This course will combine the theoretical underpinnings of finance with real-world examples.

After completion of this module, students will be able to:
- examine financial accounting concepts and financial reporting, with the focus being on how decision makers analyse, interpret, and use accounting information.
- examine how accounting measures, records, and reports economic activities for corporations and on the relationship between accrual and cash flow measures and interpreting accounting information.
- analyse value of assets and businesses given forecasts of future cash flows. Further, they will be able to examine the dynamics of stocks, bonds and interest rates in addition to measuring and pricing risk.

Course Content: (Main topics, Sub topics)

Accounting
- Accounting & the Business Environment
- Recording Business Transactions
- The Adjusting Process and Completing the Accounting Cycle
- Internal Control & Cash
- Current Liabilities & Payroll and Long-term Liabilities
- Balance Sheet
- Earnings & the Income Statement

Finance
- Cash flows associated with stocks, bonds and certain derivatives.
- How investors make decisions, NPV Rule, Present Value Calculations and Alternative Valuation Methods
- Capital Budgeting: Understanding the role of taxes
- Bond Pricing Spot rates, forward rates, bond prices and yield to maturity. No-Arbitrage, efficient markets and Security Prices.
- Simple stock valuation, Dividend Growth Model, Comparables

• The Capital Asset Pricing Model. Portfolio theory and the relationship between risk and return.   • Capital Structure in Perfect Markets, with Taxes, and Firm Valuation -- Modigliani-Miller Theorem (introduction only)   • Capital Structure

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	Final Assessment 50 %	
	Theory (%)	**Practical (%)**
Practical tasks	25%	25%

Recommended Reading:
- Charles T. Horngren, Walter T. Harrison Jr., M. Suzanne Oliver *Financial & Managerial Accounting.*

Semester 3			
Course Code:	LB 2144		
Course Name:	Effective writing skills		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

The aim of this module is to provide students with understanding of essential writing skills for business and organisations. It also makes students be able to use communication effectively for data storytelling in writing.

After completion of this module, students will be able to:
- apply the features of technical business writing in drafting business documents.
- evaluate features of various types of documentations used in the government and non-government sector.
- use appropriate terminology in written communication in diverse fields.
- write data stories.

Course Content: (Main topics, Sub topics)
- Human centred writing
- Definition of Business Writing
- Advantages and Disadvantages of Written Communication
- Grammar and Language in Business Writing
- Different Types of Business documentation
- Drafting technical business documents
- Business writing ethics

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	**Final Assessment** 50 %	
	Theory (%)	**Practical (%)**
Practical tasks	25%	25%

Recommended Reading:
- Bailey, S. (2018). *Academic writing: A handbook for international students* (Fifth ed.). London, [England] ; New York, New York: Routledge.
- Strongman, L. (2013). *Academic writing*. Newcastle upon Tyne: Cambridge Scholars Publishing.
- Marshall, C. (2018). *Technical writing for business people*. Swindon, UK: BCS Learning & Development.

Semester 4			
Course Code:	LB 2214		
Course Name:	Applied Machine Learning		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

This module provides students with a foundation of machine learning techniques and its application. Machine learning techniques are the key skills that data scientists need to process and filter the data, to detect new patterns or anomalies within the data, and gain deeper insight from the data.

After completion of this module, students will be able to:
- examine core machine learning concepts
- apply machine learning concepts in real-world problems
- prepare data for machine learning
- evaluate models and improve their performance

Course Content: (Main topics, Sub topics)
- Introduction to machine learning
- Application of machine learning
- Model training, testing, and evaluation
- Web scraping
- Feature Engineering
- Imbalanced Datasets
- Dimensionality Reduction
- Feature Selection
- Classification using K-Nearest Neighbours
- Classification using Decision Tree
- Classification using SVM
- Classification using Random Forest

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	Final Assessment 50 %	
	Theory (%)	**Practical (%)**
Practical tasks	25%	25%

Recommended Reading:
- Provost, F., & Fawcett, T. (2013). Data science for business: what you need to know about data mining and data-analytic thinking. Sebastopol: OReilly.
- Lantz, B. (2019). Machine learning with R: expert techniques for predictive modeling. Birmingham: Packt Publishing.

Semester 4			
Course Code:	LB 2224		
Course Name:	Advanced SQL and Cloud Databases		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

The aim of this module is to provide students the exposure to advanced SQL concepts (Structured Query Language) using T-SQL and introduction to cloud databases.

After completion of this module, students will be able to:
- experiment with data analytics using advanced queries.
- import and export data from multiple difference sources using SQL queries.
- discover how to work with and manipulate large datasets using advanced SQL quarries.
- speed up data analysis workflow by automating tasks and optimising queries.
- evaluate cloud database concepts.
- assess how to backup, restore, secure, and scale cloud databases.

Course Content: (Main topics, Sub topics)
- Advanced SQL
- Subqueries and CTE
- SQL Error Handling
- Transaction Isolation Levels
- Query Optimization
- Database Administrations
- Database Security
- Database High Availability options
- Database Backup and Restore
- Introduction to Cloud databases
- Azure SQL Database Architecture
- Migrating a SQL Server Database to an Azure SQL Database
- Monitoring an Azure SQL Database using the Azure Portal

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment	**Final Assessment**
50 %	50 %

Practical activities	Theory (%)	Practical (%)
	25%	25%

Recommended Reading:
- Sarka, D., Ben-Gan, I., & Talmage, R. (2014). Querying Microsoft Sql Server 2012: Exam 70-461, Training kit. Etats-Unis: Solid Quality Global SL.
- Cheshire, J. I. M. (2020). Exam Ref Az-900 Microsoft Azure Fundamentals. S.l.: Addison Wesley.

Semester 4			
Course Code:	MF 2234		
Course Name:	Operations management		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

The aim of this course is to provide an overview on operations management and make students aware of the systems and process perspectives. Students will be exposed to various operations management tools such as lean management.

After completion of this module, students will be able to:
- identify the basic principles behind operations management
- assess how operation systems are planned
- identify operations management tools
- identify key features in operations strategy, analysis, design, planning and control

Course Content: (Main topics, Sub topics)
- What is operations management?
- Planning operation systems
- Process view of organisations
- Operation strategy
- Lean operations
- Process performance
- Service operations
- Supply chain management
- Inventory management
- Forecasting
- Decision analysis
- Quality management
- Project management
- Managing risk and recovery

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment	**Final Assessment**
50 %	50 %

	Theory (%)	Practical (%)
Practical tasks	25%	25%

Recommended Reading:
- Slack, N., Brandon-Jones, A., & Johnston, R. (2016). *Operations management* (Eighth ed.). Upper Saddle River: Pearson.
- Cachon G. & Terwiesch, C. (2013). Matching Supply with Demand: An Introduction to Operations Management (3rd Ed). McGraw-Hill.

Semester 4			
Course Code:	LB 2244		
Course Name:	Research methods and research presentations		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

The aim of this module is to provide students with understanding of research methods needed to engage in an independent research study in the field. This includes both quantitative and qualitative methods with especial emphasis on quantitative methods.

After completion of this module, students will be able to:
- evaluate the fundamentals of qualitative and quantitative research methods.
- apply research methods in designing, executing and presenting an independent research study.
- present qualitative and quantitative data in research.

Course Content: (Main topics, Sub topics)
- Basic principles in research
- Quantitative research methods
- Qualitative research methods
- Sampling techniques
- Data quality
- Ethical considerations in research
- Issues in research
- Qualitative research presentation
- Quantitative research presentation
- Oral academic presentations
- Features of research papers

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	Final Assessment 50 %	
	Theory (%)	**Practical (%)**
Practical tasks	25%	25%

Recommended Reading:
- Ghauri, P., Grønhaug, K., & Strange, R. (2020). *Research methods in business studies* (5th ed.). Cambridge: Cambridge University Press.
- Wrench, J., Thomas-Maddox, Candice, Richmond, Virginia P., & McCroskey, James C. (2016). *Quantitative research methods for communication: A hands-on approach* (Third ed.). Oxford; New York: Oxford University Press.
- Balnaves, M., & Caputi, Peter. (2001). *Introduction to quantitative research methods: An investigative approach*. London; Thousand Oaks, Calif.: SAGE.
- Taylor, S., Bogdan, Robert, & DeVault, Marjorie L. (2016). *Introduction to qualitative research methods: A guidebook and resource* (4th ed.). Hoboken, New Jersey: Wiley.

Semester 5			
Course Code:	LB 3114		
Course Name:	Data Science Applications and Artificial Intelligence		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

During this semester, students will be able to apply the knowledge they have gained in previous semesters by working on real data science cases together with leading organizations. Also, this module aims to provide students with a broad overview of Artificial Intelligence. AI has the potential to replicate humans in every field. This module serves as a starting point for students to understand how AI is built, with the help of intriguing and exciting examples. This module makes students adaptive thinkers and help them apply Data Science and Artificial Intelligence concepts to real-world scenarios.

After completion of this module, students will be able to:
- apply neural networks to a varied set of applications.
- demonstrate knowledge on how Data Science and Artificial Intelligence are applied in real world scenarios.
- develop decision-making abilities with a variety of Data Science and Artificial Intelligence techniques.

Course Content: (Main topics, Sub topics)
- AI as a new frontier
- Understanding Innovation and disruption in AI
- Artificial Neural Network and its applications
- Data Science and AI-driven transformation in our economy and society.
  - Data Science and AI in Agriculture
  - Data Science and AI in Health
  - Data Science and AI in Environment
  - Data Science and AI in Defense
- AI for Sustainability

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	**Final Assessment** 50 %	
Practical tasks	**Theory (%)** 25%	**Practical (%)** 25%

Recommended Reading:
- Lantz, B. (2019). Machine learning with R: expert techniques for predictive modeling.

Birmingham: Packt Publishing.
- Finlay, S. (2018). Artificial intelligence and machine learning for business: a no-nonsense guide to data driven technologies. Great Britain: Relativistic.
- AI, IoT and the Blockchain: Using the Power of Three to create Business, Legal and Technical Solutions Paperback – 30 Dec. 2019 by Joseph Bambara (Author), Ron Espinosa (Author), Steven Wolff (Author), Paul Allen (Author), M. Ridgway Barker (Author)

Semester 5			
Course Code:	LB 3124		
Course Name:	Data Visualisation and storytelling		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

This module aims to provide students with a broad overview of the general field of data visualization and visual analytics.

After completion of this module, students will be able to:

- evaluate fundamental concepts and conventions of data visualisation techniques.
- implement different plotting techniques to produce compelling data visualisations.
- learn to create complex visualisation using R and Power BI.
- apply the basics of R and QGIS to work with GIS and remote sensing data.
- manage, manipulate, and analyse spatial data using R and QGIS.

Course Content: (Main topics, Sub topics)
- Introduction to Data Visualisation concepts
- Importance of Data Visualisation and Data Exploration
- Type of data visualisation Techniques
- Introduction to Power BI
- Dashboard Design with Power BI
- Advanced visualization with R
- Introduction to geospatial data visualisation
- Introduction to R shiny
- Introduction to QGIS
- Working with Geospatial Dataset
- Geospatial Analysis with R and QGIS

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	Final Assessment 50 %	
	Theory (%)	**Practical (%)**
Practical tasks	25%	25%

Recommended Reading:

- Maslyuk, D. (2018). Analyzing and visualizing data by using Microsoft Power Bi: exam ref 70-778. Redmond: Microsoft Press.
- Islam, S. (2018). Hands-on geospatial analysis with R and Qgis: a beginners guide to manipulating, managing, and analyzing spatial data using R and Qgis 3.2.2. Birmingham: Packt Publishing.

Semester 5			
Course Code:	MF 3134		
Course Name:	Policy analysis		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

The course aims at enhancing the students' ability for logical and structured problem analysis, their ability to present technical subjects clearly, and their ability to assess real-life economic issues relating them to their studies.

After completion of this module, students will be able to:

- appraise how the current competition and environmental policies relate with the findings of academic research in Economics.
- critically assess their impact in terms of efficiency and feasibility.

Course Content: (Main topics, Sub topics)
- Why the Government? Public Goods
Stiglitz (3), Ch 1,3,4
- Common Pool Resources: Governing the Common
Ostrom, Ch 1-2, Stiglitz (3), Ch 1,3,4
- Is it worth it? Cost-Benefit Analysis
Stiglitz (3), Ch11, HM4-Ch25
- Environmental Justice
TL: Ch 19
- Health
LGPS: Ch 2, Stiglitz (4), Ch 13
- Poverty and Inequality
LGPS: Ch 9
- Social Mobility
LGPS: Ch 9
- Welfare programmes and the redistribution of income
LGPS: Ch 9, Stiglitz (4), Ch 15
- Education
LGPS: Ch 3, Stiglitz (4), Ch 14
- Energy and renewables
TL: Ch 7.
- Social simulation

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the

practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	Final Assessment 50 %	
	Theory (%)	**Practical (%)**
Practical tasks	25%	25%

Recommended Reading:
- Joseph Stiglitz, The Economics of the Public Sector, Norton (3 or 4 edition) [S]
- Elinor Ostrom, Governing the Commons, Cambridge University Press [O]
- Hindriks and Myles, Intermediate Public Economics, MIT Press [HM]
- Le Grand, Propper, Smith, The Economics of Social Problems, Palgrave [LGPS]
- Tietenberg and Lewis, Environmental and Natural Resource Economics, [TL]

Semester 5			
Course Code:	LB 3144		
Course Name:	Corpus analysis and data presentation		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	**Theory**	**Practical**	**Independent Learning**
	45	45	110

Course Aim/Intended Learning Outcomes:

The aim of this module is to provide students with an introduction to corpus linguistics and presenting data extracted from different corpora. It focuses on corpus tools and on using corpora in diverse fields.

After completion of this module, students will be able to:

- interpret the basic features of corpus tools and corpus analysis.
- use corpus tools to analyse language features.
- effectively present the data extracted from corpora

Course Content: (Main topics, Sub topics)
- Introduction to corpora and corpus analysis
- Corpus tools
- Analysing language using corpus tools
- Extracting corpus data
- Presenting corpus data
- Genre analysis
- Discourse analysis
- Conversation analysis

Teaching /Learning Methods:

Both face-to-face and online sessions will take place. In lectures, the theoretical aspects will be introduced. They will be interactive sessions which allow students to clarify doubts and discuss the practical component of the lesson. The practical sessions will contain step-by-step exercises and activities that help build key skills.

Assessment Strategy:

Continuous Assessment 50 %	Final Assessment 50 %	
	Theory (%)	**Practical (%)**
Practical tasks	25%	25%

Recommended Reading:

- Kennedy, G. (1998). *An introduction to corpus linguistics* (Studies in language and linguistics (London, England)). London ; New York: Longman.
- Gries, S. (2009). *Quantitative corpus linguistics with R a practical introduction*. New York; London: Routledge.
- Desagulier, G. (2017). *Corpus linguistics and statistics with R: Introduction to quantitative methods in linguistics* (Quantitative methods in the humanities and social sciences). Cham, Switzerland: Springer.

Semester 6		
Course Code:	LB 3216	
Course Name:	Dissertation	
Credit Value:	6	
Core/Optional	Core	
Hourly Breakdown	**Supervision**	**Independent Learning**
	15	285

Course Aim/Intended Learning Outcomes:

The aim of this module is to provide students with an opportunity to apply their theoretical and practical knowledge in a piece of research relevant to the industry.

After completion of this module, students will be able to:
- Deploy effective data science research methodologies and embark on independent research projects in applied data science communication.
- Critically evaluate primary data sources, including datasets, surveys, and user studies.
- Demonstrate a comprehensive understanding of relevant secondary data science literature.
- Apply research ethics principles throughout the data collection, analysis, and communication process.
- Design and implement appropriate data science research methodologies to address specific communication goals.
- Construct concise, original, and well-supported arguments using data visualizations and storytelling techniques.
- Integrate diverse forms of data evidence to create compelling data narratives.
- Deliver a sustained piece of individual, original research that contributes to the field of applied data science communication.

Course Content: (Main topics, Sub topics)

In this module students complete a dissertation of approximately 10,000 words on an aspect of applied data science communication of their own choosing. The topic is negotiated between students and supervisors who represent the teaching staff. Supervisors will provide advice on all aspects of the research work from initiation to completion. The dissertation is typically based on extensive research. Planning for this large-scale project begins in the second semester and is supported by the Research Methods and Research Presentations in ADSC module. Students will be required to produce a proposal to display evidence of the viability of the research idea.

Supervision:

Each student will be given an academic supervisor who will guide the students throughout the project. Relevant readings/resources will be suggested by the supervisors.

Assessment Strategy:

100 % for the final dissertation

Semester 6		
Course Code:	LB 3224	
Course Name:	Industrial Training	
Credit Value:	4	
Core/Optional	Core	
Hourly Breakdown	**Supervision**	**Independent Learning**
	10	190

Course Aim/Intended Learning Outcomes:

This 6-month industrial training module aims to provide students with the opportunity to apply their classroom knowledge and skills in a real-world data science communication setting. Through practical work experience, students will gain valuable insights into the professional landscape of data science communication and develop essential industry-specific competencies.

After completion of this module, students will be able to:
- apply data science communication skills to solve practical problems within an organizational context.
- collaborate effectively with data scientists and other professionals on data analysis and communication projects.
- translate complex data insights into clear, concise, and compelling narratives for diverse audiences.
- utilize industry-standard data visualization tools and techniques to create impactful and informative presentations.
- adapt communication strategies to meet the specific needs and goals of different stakeholders.
- demonstrate professional communication skills in a workplace environment.
- develop strong work ethic, time management, and problem-solving abilities in a data-driven setting.
- build professional networks within the data science communication industry.

Training Structure:

The industrial training module will involve a placement with a data science-focused organization for a predetermined period of six months. Students will work under the supervision of experienced professionals and participate in real-world data science communication projects. The specific nature of the training will vary depending on the placement organization. However, common training activities may include:
- Data analysis and interpretation
- Data visualization and storytelling
- Content creation for various communication channels (e.g., reports, presentations, social media)
- Client communication and stakeholder engagement
- Project management and collaboration

Assessment Strategy:

Logbook (This will document the student's consistent participation and engagement throughout the 6-month training period.) Supervisor reports (evaluating participation, skills development, and professional conduct)

12. Annexes

12.1 Course unit system of the university

GPA Course Units

GPA Course Units are those Course Units that have GPA credits. Such Course Units are considered for the calculation of Semester Grade Point Average (SGPA), Yearly Grade Point Average (YGPA) and Final Grade Point average (FGPA).

NGPA Course Units

NGPA Course Units are those Course Units that have Non-Grade Point Average (NGPA) credits. Such Course Units are not considered for the calculation of SGPA, YGPA and FGPA.

MGPA Course Units

MGPA Course Units are those Course Units that have Military Grade Point Average (MGPA) credits. Such Course Units are considered for the calculation of SGPA, YGPA and FGPA.

Grades and Grade Point Values of Course Units

Student performance is graded on a 12-point scale ranging from A+ to E as depicted below.

Marks	Grade	GPV
85 – 100	A+	4.00
75 – 84	A	4.00
70 – 74	A-	3.70
65 – 69	B+	3.30
60 – 64	B	3.00
55 – 59	B-	2.70
50 – 54	C+	2.30
45 – 49	C	2.00
40 – 44	C-	1.70
35 – 39	D+	1.30
30 – 34	D	1.00
00 – 29	E	0.00

Incomplete examination results will be denoted by the following abbreviations.
- IA- Incomplete Assessments
- IE- Incomplete Examination
- IB- Incomplete both
- AB – Absent for a course unit Ex- Excused on a valid reason

Grade Point Average (GPA)

The GPA is the credit weighted average of the grade points of value of all Course Units except NGPA Course Units taken in the degree programme. It is calculated for each semester (SGPA), for each year (YGPA) and for the entire degree programme (FGPA).

Index	Meaning	Purpose
SGPA	Cumulative GPA for a semester	To ascertain whether a student has or has not completed a particular semester
YGPA	Cumulative GPA for a year	To Ascertain whether a student can proceed to the following year without being relegated
FGPA	Cumulative GPA for a year entire period of a degree programme	To ascertain the overall performance of a student in the degree programme, i.e. to determine a Pass, a 2nd Lower, a 2nd Upper or a 1st Class

The GPA is calculated as follows.

$$GPA = \frac{\sum X_i Y_i}{\sum Y_i}$$

Where X_i = Grade Point Value of the ith Course Unit

Yi = Number of credits of the ith Course Unit

Calculating Semester Grade Point Average (SGPA)

$$SGPA = \frac{\sum Grade\ Point\ scored\ for\ i^{th}\ course\ unit \times Credit\ Value\ of\ the\ Course\ Unit}{Cumulative\ credit\ value\ of\ all\ GPA\ modules\ of\ the\ semester}$$

Calculating Yearly Grade Point Average (YGPA)

The Year GPA for a degree programme will be calculated for the fourth decimal place on the completion of two main semesters and the mid semester (if available) as follows.

$$YGPA = \frac{\sum Grade\ Point\ scored\ for\ i^{th}\ course\ unit \times Credit\ Value\ of\ the\ Course\ Unit}{Cumulative\ credit\ value\ of\ all\ GPA\ modules\ of\ the\ Year}$$

Calculating Final Grade Point average (FGPA)

The Final GPA for a degree programme will be calculated for the fourth decimal place on the completion of all requirements for such programmes as follows:

$$FGPA = \frac{\sum Grade\ Point\ scored\ for\ i^{th}\ course\ unit \times Credit\ Value\ of\ the\ Course\ Unit}{Cumulative\ credit\ value\ of\ all\ GPA\ modules\ of\ the\ degree\ programme}$$

12.2 Criteria for awarding degrees and classes of the university

Criteria for Award

1. Satisfaction of the requirements for the completion of all semesters of the Degree Programme.
2. Fulfilment of the criteria for completing the examinations within the maximum stipulated time period for each degree programme from the date of the commencement of the Semester 1
3. Earning a GPA of not less than 2.00 for each semester and for the entire degree programme
4. Following a programme of study for the minimum stipulated period of time
5. Not having any E grades
6. Not having more than one GPA Course Unit with a 'D+' or a 'C-' grade in a semester
7. Not having a Grade less than 'C' for NGPA modules
8. Successfully completing the FGPA modules.

Award of Classes

1. Awarding of classes shall be determined at the completion of all requirements for graduation within the minimum time period stipulated for each degree programme. The stipulated time period is four (04) years.
2. Classes shall be awarded based on the FGPA as indicated below.

FGPA	Results
3.70 – 4.00	First class – 1
3.30 – 3.69	Second class (Upper Division) – 2.1
3.00 – 3.29	Second class (Lower Division) – 2.2
2.00 – 2.99	Pass – 3

First Class

For the award of a First Class, a student shall:

a) Have completed all the requirements within 6 semesters (in the case of degree with 6 semesters), except upon approvals granted by the BOM on the recommendation of the BOE for a valid and accepted reason(s).
   and
b) have earned a GPA of not less than 3.70 for the entire Degree Programme
   and
c) not have earned any failure grades (i.e. E) and d) not have earned grades below C for the entire Degree Programme at the time of finalizing the awarding of classes
   and
d) not have earned a grade below "B+"(65%) in the last year examination in military training at respective Military Academies.

Second Class (Upper Division)

For the award of a Second Class (Upper Division), a student shall:

a) have completed all the requirements within 6 semesters (in the case of degrees with 6 semesters), except upon approvals granted by the BOM on the recommendation of the BOE for a valid and accepted reason(s);
   and
b) have earned a GPA of not less than 3.30 for the entire Degree Programme;
   and
c) not have earned any failure grades (i.e. E)
   and
d) not have earned a grade below "B" (60%) in the last year examination in military training at respective Military Academies.

Second Class (Lower Division)

For the award of a Second Class (Lower Division), a student shall:

a) have completed all the requirements within 6 semesters (in the case of degrees with 6 semesters), except upon approvals granted by the BOM on the recommendation of the BOE for a valid and accepted reason(s)
   and
b) have earned a GPA of not less than 3.00 for the entire Degree Programme
   and
c) not have earned any failure grades (i.e. E)
   and
d) not have earned a grade below "B" (60%) in the last year examination in military training at respective Military Academies.

Merit awards

Students obtaining the highest FGPA in Military Studies and/or Academic Studies shall be entitled for the respective Awards/Medals/Trophies of merit.

Some Awards/Medals/Trophies

The Awards/Trophies to which students may be eligible on the recommendation of relevant authorities and the approval of the BOM are:

i.   Trophy for the First in Order of Merit awarded by Gen. SC Ranatunga VSV, USP, psc.
ii.   Best officer cadet Army/Navy/Air Force
iii. Trophy for the best Sportsman awarded by the KDU
iv.   The Sword of Honour

12.3 Eligibility criteria to sit end of semester examinations

As per the bylaw of the FMSH:

9. A student admitted to a particular degree programme is eligible to sit each examination paper relevant to the course of study in a particular semester, provided that he/she has an attendance record of not less than seventy percent (70%). All excuses including medicals should be within the remaining thirty percent (30%). The Faculty Board, based on the attendance report submitted by the respective HOD, should approve the eligibility list.
10. A student who acquires such eligibility to any examination shall sit such examination on the first available occasion.
11. Those who are not eligible for examination under section 1 above can apply for the next examination as repeat candidates.

12.4 Criteria for completing a semester

A student shall satisfy the following minimum requirements for the purpose of completing (passing) a particular semester. He/she should:

12. Obtain a SGPA of 2.0 or above for the whole semester,
13. Obtain a 'C' grade or above for all Course Units. However, not more than one GPA Course Unit with a 'D+' or a 'C-' grade shall be permitted per semester provided the SGPA is 2.00 or above.
14. Military course units which comprise of MGPA and courses conducted in respective military academies will be subject to the By-laws of FDSS (Please refer to By-laws promulgated by the FDSS).

12.5 Discontinuation from the programme

A student shall be deemed to have discontinued from the degree programme at the University under following conditions.

a) When a student has been unable to complete the degree programme within six (6) years or twelve (12) consecutive semesters (the maximum period).
b) If a student has been determined to be unfit to continue his/her studies at the University by a competent medical board recommended by the University on account of an illness and/or a disability that has occurred after the enlistment of such student to the University, he/she shall have to discontinue his/her degree programme at the University automatically without paying compensation.
c) In the case of officer cadets and Commissioned Officers the regulations of the By-laws are subject to the By-laws of the FDSS.
d) If a student is relegated 2 times on account of a failure in an examination and/or on disciplinary grounds, he/she may be considered for discontinuation/discharge by theBOM.

12.6 Military training programme for those who enroll as offer cadets

The military training programme is a compulsory component for all officer cadets and is run parallel to the degree programmes. This programme is conducted by the Faculty of Defence and Strategic Studies and enables officer cadets to confidently assume the responsibilities of commissioned officers of the armed forces.

The Department of Defence and Strategic Studies is under the guidance of the Dean of Faculty of Defence and Strategic Studies who is assisted by Squadron Commanders in charge of each intake and Troop Commanders in charge of each troop. These officers with the assistance of the other rank instructors impart the essential military knowledge both in the classroom and on the field to the officer cadets. The main components of military training include joint staff duties, leadership studies, land warfare, maritime warfare, air warfare, physical training, drill, weapon training, field craft, map reading, service writing and other methods of instructions which are crucial for the profession of arms.

Furthermore, an integral aim of military training is to inculcate discipline amongst the officer cadets. Diverse programmes are conducted to produce highly disciplined officers with high standards of integrity and loyalty.

12.7 Scholarships and sponsorships for cadets and day-scholars

Every year, the university gets scholarships from foreign military academies for cadets to study part of their degree programme inclusive of travelling cost and living allowances. The scholarship amount will vary with the availability of placements. Further, the university and tri-forces bear the full cost on international tournaments attended by students through the university.

Entrance scholarship: Day-scholars whose parents are employed in tri-forces in Sri Lanka and the Sri Lanka Police are eligible to apply for a 50% (tri forces) or 40% (Police) discount of the course fee at the entry. Children of KDU employees also receive a discount from the course fee.

12.8 Events

Seminars and workshops

The Department organizes seminars and workshops by industry experts and renowned academics in the field where students can gain information on novel changes in the industry, career opportunities and research insights.

Career Fair

Career fair is organized by the Faculty of Management, Social Sciences and Humanities to support the Day-scholars to find worthwhile internship placements and provide an opportunity for students from previous intakes to find permanent employment in some of the leading companies

of the country. The representatives of several top ranked private companies patriciate in this event and give the opportunity to students to obtain information regarding their prospective internships.

12.9 KDU facilities

Library

General Sir John Kotelawala Defence University Library is well equipped with academic resources relevant to all fields of study. The premises provides study spaces for students and faculty libraries house materials relevant to the faculties. Books can also be ordered online.

Language Laboratories

There are two language laboratories maintained by the Department of Languages. Audio and video materials and equipment are available for self-study.

IT Facilities

The university provides free wifi, computer lab facilities and technical support for all the students and the staff of the university. Students have access to IT laboratory and the IT Support Centre from 0800 hrs to 1600 hrs on weekdays. All students receive a university email account and access to Learning Management System.

Medical Facilities

KDU Hospital and the University Medical Centre provides necessary health care facilities for both Officer Cadets and Day-scholars. The university Medical Officer has the sole authority to issue medical certificates for students.

Cafeteria Facilities

The university cafeteria located in the ground floor of the Medical Faculty building caters to day-scholars and civil staff of the university. In addition, student can buy their snacks and other items from the Honour Shop situated opposite Cadet Mess building.

Sports

The university provides facilities for the students for games such as soccer, cricket, rugby, basketball, volleyball, netball, boxing and hockey as well as for individual sports like squash, tennis, badminton, table tennis, weightlifting and swimming. Particularly, the officer cadets are expected to maintain their physical fitness and foster a comradeship in keeping with the service traditions by actively participating in sports. Trained civilian/service instructors and coaches provide training to individuals and teams. KDU teams play regular matches with other universities and clubs. Entrance to National and International Tournaments at appropriate levels are also facilitated for the students. KDU also has a well-equipped gymnasium.

Student Mentoring

An academic is allocated to every student as his/her mentor to discuss their academic or personal difficulties they may encounter during the study period. Students are advised to meet their mentor regularly within the allocated hours of the timetable to discuss their matters. Mentors work with students and guide them to find possible solutions for their common or individual issues.

Student Counselling

Some Students may undergo personal or psychological problems during their time at KDU. University provides a qualified and dedicated counsellor for those students to discuss any problems or difficulties within a safe and confidential space. If a student needs counselling, he or she needs to make a prior appointment.

Club Activities

The students have the opportunity to participate in different types of club activities to improve their skills and talents and to be socialized with the student community. These clubs include Photography, Music and Dancing, Arts and Culture, Drama, Toast Masters, Chess, Air Riffle and Rowing.

12.10 Annual events of the university

General Convocation

General convocation of KDU is held at the end of the year at BMICH in the presence of Chancellor, Vice chancellor, invited chief guest and other guests, academic and nonacademic staff of the university and the parents/relatives of graduating students. All undergraduate and postgraduate degree are conferred at this convocation.

International Research Conference

The International Research Conference (IRC) of KDU is held at the university premises in August or September of every year. The aim of this conference is to provide a forum for researchers and professionals to exchange opinions and share latest findings across a broad range of disciplines. The conference seeks to foster networking and collaborations within and between academia and industry at the national and international levels and be a catalyst to encourage the innovation and the creativity of enthusiastic young researchers. The students of KDU are also given the opportunity to participate and disseminate their valuable research findings at this conference.

University Open Day

The open day is organized by the university to provide information to potential candidates who expect to begin their higher studies at KDU. The university is open for the general public from 0900 to 1700 hours of this day to obtain necessary information about the degree programmes, facilities and other activities of the university. Open day events are mostly run by the current students.

Sports Meet

In the KDU sports meet students compete in several different track and field events. The winners of this sports meet are given the opportunity to participate in national and international sports competitions.

Parents' Day

Parents' Day is held for the first-year students of the university to demonstrate their skills and abilities to their parents. This is a colourful day for the students as it is filled with a variety of joyful events such as singing, dancing, gymnastic, drill and traditional martial arts performances.