BSc (Hons) Data Science (FT) - IC 324

1.   Context and Objectives

Data Science is a rapidly growing and interdisciplinary field that consists of extracting knowledge and insights from data to help understand a problem area and make decisions. To do these, the data scientist must master a large number of domains ranging from Mathematics to Computing (both fundamental and technological aspects) while also having a broad knowledge in order to propose the best possible models and to be able to interpret results in the most efficient ways. Data scientists should be able to develop algorithms to process data, visualize and analyse them using either by conventional statistical tools or techniques such as machine learning. There is a growing demand for data professionals in both public and private sectors as the amount of data generated grows and modern technologies such as Internet of Things (IoT), Big Data and Cloud Computing become more prevalent.

This Bachelor is a three-year programme, run jointly by the University of Mauritius and the University of Paris-Seine, France. The objective of this Bachelor's degree is to enable the training of data scientists on a wide spectrum of knowledge in different domains. Introductory courses in fields where data science will be applied such as maths, statistics and physics are also offered to ensure that students are imparted with the knowledge and analytical skills required to transform data into intelligence.

Job prospects for graduates exist in the fields of Data science, Data Engineering, Business Analytics, Business Intelligence, Banking, Artificial Intelligence, Software Development, Statistics and Digital Marketing among others.

Level 1 & 2 modules cover the fundamental topics in Mathematics, and Computing. They also deal with the technical aspects of the field. The modules have been designed to impart students with a wide range of skills as well as the aptitude to deal with an ever-changing field. Level 3 modules are specialised modules which cater for innovation in the field. Students will undertake research and projects to enable them to bring together a large number of concepts from the programme.

Objectives

The programme has been designed to enable students to:
- Acquire problem solving skills which will allow them to transform data into intelligence;
- Have a deep understanding of the professional responsibilities related to the use of data science techniques in organisations;
- Acquire and apply analytical skills which will enable them to work with data from social media, web and search engines;
- Analyse a complex problem and make informed decisions based on analysis of existing data and rate the different proposed solutions;
- Engage in different activities which involve problem solving and critical thinking to analyse business problems, propose and implement solutions;
- Impart essential technical and soft skills in graduates allowing a smooth transition to the industry; and
- Demonstrate the ability to be a productive team member in a data science context and business environment.

Competencies

After successful completion of this programme, graduates should be equipped with the following competencies:

- Analytical, problem solving and programming skills;
- Effective communication skills, adaptability and flexibility;
- Project management skills; and
- Data and business analytics skills.

2. Learning Outcomes

At the end of this programme, the student should be able to:

- Analyse business or social or economic problems and apply data science knowledge to provide effective and efficient solutions;
- Use tools and techniques to model and implement data science solutions;
- Conduct statistical analyses for data, including performing data cleansing steps and creating visuals as part of the exploratory data analysis step;
- Apply analytical skills for enterprise systems, business intelligence and emerging fields in data science;
- Interpret results obtained from analyses both graphically and numerically; and
- Demonstrate the ability to work in team projects and communicate effectively using both verbal and written skills.

3. Teaching and Learning Methods

The Bachelor Data Science programme consists of Teaching Contact Hours, Self-Study and Other Learning Activities. Teaching methods may include face to face lectures, online delivery, tutorials or practical sessions.

For each module, 6 ECTS credits contribute to 60 hrs of direct contact, 30 hrs of self-study and 90 hrs of other activities, except for SIS 3000Y(5), for which the details about the total hours in each category will be specified in the module catalogue

Other Learning Activities may comprise of the following:
- Working on assignments;
- Sitting for Class Tests and preparation time for same;
- Sitting for Examinations and preparation time for same;
- Group work;
- Attending Workshops/Conferences recommended by the Department/Faculty;
- Fieldwork;
- Site Visits/Trips;
- Additional Practicals;
- Presentations among peers;
- Experiential Learning;
- Placements/Internships;
- Guest lectures.

4. **Entry Requirements**

- **General Requirements**

  As per General Entry Requirements for admission to the University for Undergraduate Degrees.

- **Programme Specific Requirements**

  At least 2 GCE 'A' Level Passes including Mathematics.

  For French High School System: Applicants with Stream S for Science.

  Or any equivalent qualification acceptable to the University.

5. **Programme Duration**

	Years	
	Minimum	**Maximum**
Degree:	3	5

6. **Minimum ECTS Credits Required**

(i) For Degree Award

For the degree award in BSc (Hons) Data Science, the student must obtain at least 192 ECTS credits including:

Modules	ECTS Credits
Minimum ECTS Credits for Core Modules	165
Project	18
Internship	9
TOTAL	192

(ii) For Each Academic Year

Students may register for a minimum of 3 ECTS credits and a maximum of 48 ECTS credits per semester.

(iii) Exit Points

This programme does not make provision for exit points (at a lower level).

It is to be noted that 1 ECTS credit consists of 10 hrs of direct contact, 5 hrs of self-study and 15 hrs of other learning activities (Total: 30 hrs) whereas 1 LCCS credit of UoM consists of 5 hrs of direct contact, 10 hrs of self-study and 15 hrs of other learning activities (Total: 30 hrs).

7. Assessment and Deadlines

All modules in this programme will be assessed through 100% continuous assessment and the pass mark for each module will be 50%.

The assessment for each module may be based on one or a combination of the following:
- Continuous Assessment (teamwork and individual)
- Software Evaluation
- Portfolio Evaluation
- Oral or Written Examination

The specific details and/or formula for the calculation of the final mark are provided in the Module Catalogue for each module.

8. List of Modules

Module Code	Module Name	ECTS Credits
Year 1 - Semester 1 & 2 (60 ECTS Credits)		
MA 1020(1)	Linear Algebra	6
MA 1021(1)	Mathematical Analysis I	6
SIS 1064(1)	Propositional and Predicate Logic	3
PHYSI 1010(1)	Physics	6
ICT 1101(1)	Introduction to Computer Science	6
SIS 1065(1)	Scientific Writing and Presentation	3
MA 1022(1)	Matrix Computation	3
MA 1023(1)	Differential Equations	3
MA 1024(1)	Mathematical Analysis II	6
SIS 1066(1)	Programming	6
ICT 1201(1)	Computer Architecture	3
STAT 1244(1)	Probabilities & Statistics	6
SIS 1067(1)	Graphs	3
Year 2 (69 ECTS Credits)		
MA 2020(3)	Numerical Computation	3
SIS 2071(3)	Introduction to Data Science	3
SIS 2072(3)	Databases	6
SIS 2073(3)	Data Structures	6
SIS 2074(3)	Algorithms	6
SIS 2075(3)	Software Engineering I	6
ICT 2201(3)	Operating Systems & System Programming	6
SIS 2076(3)	Object Oriented Programming	6

STAT 2216(3)	Statistical Analysis Methods in Data Science	6
ICT 2202(3)	Networks	3
SIS 2077(3)	Software Engineering II	6
SIS 2078(3)	Knowledge of Enterprise	3
SIS 2201(3)	Internship	9
Year 3 (63 ECTS Credits)		
STAT 3117(5)	Optimization	6
STAT 3118(5)	Advanced Statistical Methods	3
DGT 3124(5)	Web Programming	6
ICT 3101(5)	Parallel Computing	3
STAT 3119(5)	Data Mining	6
SIS 3139(5)	Data Warehousing	3
ICT 3102(5)	Languages and Automata	3
SIS 3201(5)	Artificial Intelligence	3
SIS 3202(5)	Machine Learning	3
DGT 3201(5)	Cloud Computing	3
DGT 3202(5)	Web Services	3
SIS 3203(5)	Image Processing	3
SIS 3000Y(5)	Project	18

Note: Contact Hours = L: Lectures + T* : Tutorials + P*: Practicals*

9. Programme Plan

Module Code	Module Name	Total Contact Hours per Semester L*/T*/P*	ECTS Credits
LEVEL 1: SEMESTER 1 (30 ECTS Credits)			
MA 1020(1)	Linear Algebra	30+0+30	6
MA 1021(1)	Mathematical Analysis I	30+0+30	6
SIS 1064(1)	Propositional and Predicate Logic	15+0+15	3
PHYSI 1010(1)	Physics	30+0+30	6
ICT 1101(1)	Introduction to Computer Science	30+0+30	6
SIS 1065(1)	Scientific Writing and Presentation	15+0+15	3
	Sub Total		**30**
LEVEL 1: SEMESTER 2 (30 ECTS Credits)			
MA 1022(1)	Matrix Computation	15+0+15	3
MA 1023(1)	Differential Equations	15+0+15	3
MA 1024(1)	Mathematical Analysis II	30+0+30	6
SIS 1066(1)	Programming	30+0+30	6
ICT 1201(1)	Computer Architecture	15+0+15	3
STAT 1244(1)	Probabilities & Statistics	30+0+30	6
SIS 1067(1)	Graphs	15+0+15	3
	Sub Total		**30**
LEVEL 2: SEMESTER 1 (30 ECTS Credits)			
MA 2020(3)	Numerical Computation	15+0+15	3
SIS 2071(3)	Introduction to Data Science	15+0+15	3
SIS 2072(3)	Databases	30+0 +30	6
SIS 2073(3)	Data Structures	30+0+30	6
SIS 2074(3)	Algorithms	30+0+30	6
SIS 2075(3)	Software Engineering I	30+0+30	6
	Sub Total		**30**

LEVEL 2: SEMESTER 2 (39 ECTS Credits)			
ICT 2201(3)	Operating Systems & System Programming	30+0+30	6
SIS 2076(3)	Object Oriented Programming	30+0+30	6
STAT 2216(3)	Statistical Analysis Methods in Data Science	30+30+0	6
ICT 2202(3)	Networks	15+0+15	3
SIS 2077(3)	Software Engineering II	30+0+30	6
SIS 2078(3)	Knowledge of the Enterprise	15+0+15	3
SIS 2201(3)	Internship		9
	Sub Total		**39**
LEVEL 3: SEMESTER 1 (30 ECTS Credits)			
STAT 3117(5)	Optimization	30+0+30	6
STAT 3118(5)	Advanced Statistical Methods	15+0+15	3
DGT 3124(5)	Web Programming	30+0+30	6
ICT 3101(5)	Parallel Computing	15+0+15	3
STAT 3119(5)	Data Mining	30+0+30	6
SIS 3139(5)	Data Warehousing	15+0+15	3
ICT 3102(5)	Languages and Automata	15+0+15	3
	Sub Total		**30**
LEVEL 3: SEMESTER 2 (33 ECTS Credits)			
SIS 3201(5)	Artificial Intelligence	15+0+15	3
SIS 3202(5)	Machine Learning	15+0+15	3
DGT 3201(5)	Cloud Computing	15+0+15	3
DGT 3202(5)	Web Services	15+0+15	3
SIS 3203(5)	Image Processing	15+0+15	3
SIS 3000Y(5)	Project		18
	Sub Total		**33**

This Programme has been amended as follows: 2019, 2020