London South Bank University

Module Guide

Big Data and Database Systems

School of Engineering 2019 / 20

Level 5

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1. MODULE DETAILS

Module Title:	Big Data and Database Systems
Module Level:	5
Module Reference Number:	CSI-5-BDD
Credit Value:	20
Student Study Hours:	200
Contact Hours:	65
Private Study Hours:	135
Pre-requisite Learning (If applicable):	None
Co-requisite Modules (If applicable):	None
Course(s):	Informatics Framework
Year and Semester	2019/20 – Semester 2
Module Coordinator:	George Ubakanma / Daqing Chen
MC Contact Details (Tel, Email, Room)	ubakang@lsbu.ac.uk, FW200/chend@lsbu.ac.uk, FW216
Teaching Team & Contact Details (If applicable):	Ioannis Ioatropolous, iatropoi@lsbu.ac.uk FW218
Summary of Assessment Method:	Coursework: 60%, Exam: 40%

2. SHORT DESCRIPTION

This module covers the concepts and practice of Database Systems Management as well as the fundamentals of Big Data processing. The subject of the database field is concerned with how to use computers to store and manage data, usually large quantities of data, that is accessible locally and remotely via the web, the cloud etc…

3. AIMS OF THE MODULE

The study of databases is typically a core area in undergraduate information technology and systems courses. This module will aim to provide you with an understanding of various database issues such as database management, data modelling, relational database theory, data integrity and security, and the database query language SQL (Structured Query Language). In addition, the module will also introduce you to some of the intermediate aspects of databases such as triggers, procedures Web databases, Big Data and Data Warehousing.

4. LEARNING OUTCOMES

4.1 Knowledge and Understanding

To be able to:

- Critically discuss and evaluate a broad range of data management & big data issues including data administration, integrity and security. (Maps to: BCS 2.2.1 a1-a6).

4.2 Intellectual Skills

To be able to:

- Discuss the continuing development of big data - database technologies/ applications and the need for continued study, reflection, and development throughout a career as a database professional. (Maps to: BCS 2.2.1 a7-a9).

4.3 Practical Skills

To be able to:

- Design, implement, query and secure database applications and Internetworking for database systems (Maps to: BCS 2.2.1 b1-b4)

4.4 Transferable Skills

To be able to:

- Develop skills for both autonomous and independent practice, including oral and written communication skills.

5. ASSESSMENT OF THE MODULE

Exam 40% : Coursework 60%

Summative Assessment

Exam (40%): 2-hour unseen paper from a selection of areas from the module content. Tutorial Logbooks containing Tutorial Exercise attempts only.are allowed Lecture slides, text books, calculators are not allowed. (Maps to: BCS 2.2.1 a1-a9) (LO1, LO2, LO3)

Coursework (60%): Expected to consist of an individual assessment activity primarily based around a substantive case study. It is a practical implementation assignment including elements of database and big data technology.

(Maps to: BCS 2.2.1 b1-b4) (LO1, LO3, LO4)

Formative Assessment

Skills for the summative assessment will be embedded throughout formative opportunities in Lectures and Workshops. Formative assessment will take different forms, such as:

- verbal feedback on tutorial activities
- observation and questioning to provide instant feedback as the student takes part in learning activities
- think-pair-share concept and class discussions

6. FEEDBACK

There will be **feedback on the weekly activities** you will be asked to undertake. Each week you will be set an activity (or set of activities). Sometimes it is unlikely that these activities will be completed in class. In fact, we strongly recommend that once available via the VLE site, you do the activities before class and then bring any questions to and seek feedback during the sessions. It is your responsibility to complete the work in your own time and make sure you are up to date every week. Feedback on submitted assessments will be given within two weeks..

7. INTRODUCTION TO STUDYING THE MODULE

7.1 Overview of the Main Content

- An introduction to databases and the relational data model
- Normalisation & Data Modelling techniques
- Relational database management systems
- SQL and triggers, stored procedures
- Database security/administration
- Database connectivity and web databases,
- Data Warehousing and Big Data Concepts
- Data understanding and Data preparation
- Analytics, reporting and visualisation techniques…

7.2 Overview of Types of Classes

The module will be a mixture of lectures, discussions, and work in the laboratories. The weekly contact time consists of a lecture followed by exercises and activities. Learning will be achieved through mixed format lectures, supported by practical and lab-based activities. You will be expected to read through the texts, to participate in the classroom discussions, and to work through the assigned exercises and activities..

7.3 Importance of Student Self-Managed Learning Time

The module has been developed for level 5 students. A high level of maturity, both in attitude and comprehension, is assumed of the students, who should be able to work independently. Students are required to contribute to their own learning and the learning of others by participating in class discussions. You are expected to put in at least a couple of hours in your own time for every contact hour.

7.4 Employability

Data and databases are at the heart of every organisation’s information systems infrastructure. Acquiring skills and being able to demonstrate competence in the areas of analytics, big data, databases therefore clearly improves your chances of gaining and retaining good employment opportunities..

8. THE PROGRAMME OF TEACHING, LEARNING AND ASSESSMENT

Week #	Topic	Lab	Chapter
1	Introduction to the Module + Introduction to Relational Model + Data Modelling	Introduction to online resources Activities on Data Modelling + Entity Relationship Modelling	Kroenke and Auer 1, 5, 6
2	Relational Model + Normalisation	Activities on Relational Model + Normalisation;	3, 4
3	SQL	SQL Activities	2 ,3
4	SQL (cont)	SQL Activities	3
5	Stored Procedures (Persistent Stored Modules)	SQL Activities	7
6	Managing Multiuser Databases	Database Security and SQL	9
7	Big Data, Data Warehouses and Business Intelligence	Introduction to Data Warehouses and Business Intelligence **Coursework starts**	12
8	Data Science Essentials	Exploration of Open Data Source and Data Manipulation	Ch 2, Field Chs 2 & 3, Sabherwal & Becerra-Fernandez
9	Business Analytics	RFM Analysis. Response Model.	Chs 3 & 13, Field Chs 3 & 4, Sabherwal & Becerra-Fernandez
10	Visual Analytics and Information Dashboard Development Tableau Essentials I	Tableau Activities	Ch 5, Field Ch 6, Sabherwal & Becerra-Fernandez Supplementary material
EASTER … EASTER… EASTER … (**--- 3 WEEKS ---**)… EASTER … EASTER … EASTER			
11	Tableau Essentials II	Tableau Activities	Supplementary material
12	**Coursework Submission**	**Bank Holiday (Fri 8 May) – LSBU closed**	Supplementary material
13	Exam Revision	Exam Revision	

Note: this schedule is for guidance only. Order of topics and their presentation dates may be altered.

9. STUDENT EVALUATION

New Module…No available evaluation from previous year.

10. LEARNING RESOURCES

10.1 Core Materials

Core:

- Kroenke, D.M. and Auer, D.J. (2016) *Database Concepts,* 14th Ed., Pearson Education.

978-0132742924

This is the core text we will be using throughout. It is essential that you have access to it, start reading and working on the activities in this book from the very beginning.

- Elmasri, R. and Navathe, S.B. ISBN-13: 978-1292107639
- Cady, F. (2017) *The Data Science Handbook Hardcover*, 1st Ed., Wiley-Blackwell, ISBN: 978-1119092940.
- Sabherwal, R. and Becerra-Fernandez, I. (2011) *Business Intelligence: Practices, Technologies, and Management*, John Wiley & Sons, Inc., ISBN: 978-0470461709.

10.2 Optional Materials

You will be directed to additional materials as we make progress.

Optional:

- Coronel, C. Morris, S. (2016) Database Systems: Design, Implementation, & Management; Cengage Learning Custom Publishing.
- Pratt, P. Last, M. Starks, J. (Feb 2018) 9th Ed. Concepts of Database Management; Cengage Learning Custom Publishing.

Useful URLs:

- Tableau®, a powerful tool for data visualization: http://www.tableausoftware.com/public/. https://www.tableau.com/academic.