INFS2608
DATABASE MANAGEMENT & BIG DATA INFRASTRUCTURES

Course Outline
Semester 1, 2017

Part A: Course-Specific Information

Contents may change.

Please consult Part B for key information on Business School policies (including those on plagiarism and special consideration), student responsibilities and student support services.

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PART A: COURSE-SPECIFIC INFORMATION

1   STAFF CONTACT DETAILS

Position	Name	Email	Room	Phone
Lecturer in Charge (LIC)	Dr Daniel Schlagwein	schlagwein@unsw.edu.au	Q2114	56487
Lab Tutor	Rafiya Harun	r.harun@student.unsw.edu.au	–	–
Lab Tutor	Wilbert Wu	wilbert.wu@student.unsw.edu.au	–	–
Lab Tutor	Morgan Xu	morgan.xu@unsw.edu.au	–	–
PASS Leader 1	TBC	TBC	–	–
PASS Leader 2	TBC	TBC	–	–

Consultation by appointment. If you need to contact the school urgently, ring 9385-5320 or email istm@unsw.edu.au. For messages to the LIC or the school, please use your UNSW email address (do not use external email addresses, Moodle messaging or emails). Start email subjects with the course code, INFS1603, and sign the email with your full name and student number. Emails not meeting this conditions may not be answered.

2   COURSE DETAILS

2.1   Teaching Times and Locations

The lectures start in week 1 (to week 12). The labs start in week 2 (to week 13). The PASS classes (TBC) start in week 3 (to week 13). The timetable may change.

Element	Day and Time	Location
Lecture A 7649	Thu 4 – 6 pm	Rex Vowels Theatre
Lab 1 H18A 7654(Morgan)	Thu 6 – 7 pm	Quadrangle G021
Lab 2 F09A 7650 (Rafiya)	Fri 9 am – 10 am	Quadrangle G021
Lab 3 F10A 7651 (Rafiya)	Fri 10 am – 11 am	Quadrangle G021
Lab 4 F11A 7652 (Wilbert)	Fri 11 am – 12 pm	Quadrangle G021
Lab 5 F12A 7653 (Rafiya)	Fri 12 pm – 1 pm	Quadrangle G021
Lab 6 F12B 10465 (Wilbert)	Fri 12 pm – 1 pm	Quadrangle Lab 1
Lab 7 F16A 10524 (Wilbert)	Fri 4 pm – 5 pm	Quadrangle G021
PASS Class 1	TBC	TBC
PASS Class 2	TBC	TBC

2.2   Units of Credit

The course is worth 6 units of credit.

2.3   Summary of Course

INFS2608 is a Level 2 Information Systems (IS) course that continues students' study of IS by covering various advanced topics pertinent to big data management, which includes both relational and analytical data system infrastructure. It will explain advanced concepts used to design and manage relational and analytical big data system

infrastructure. Through this course, students will learn to evaluate issues associated with big data management and business data analytics such as data quality and security. In taking this course, students will be provided with tasks and assignments that will aid in refining their ability to evaluate the value of data focused infrastructures.

In particular, topics in the course include advanced relational modelling and SQL, database design and management for enterprises, transaction management, security, Internet-based databases, data warehousing, business intelligence and Big Data fundamentals, infrastructures and analytics. The course includes a practical component on a real-world based database design or analytics scenario.

2.4   Course Aims and Relationship to Other Courses

This course aims to deepen students' understanding of various advanced topics pertinent to database management with big data and how they are being applied in business data analytics. Furthermore, the course aims to develop students' knowledge in designing, managing and evaluating big data infrastructure. Students will practice self-directed work in groups that will help them develop their interpersonal communication, project management and quality assurance skills.

The course requires successful completion of INFS1603.

2.5   Student Learning Outcomes

The Course Learning Outcomes are what you should be able to DO by the end of this course if you participate fully in learning activities and successfully complete the assessment items.

	Course Learning Outcomes
	On successful completion of the course, you should be able to:
1.	Investigate emerging technologies and recent trends in database design to support big data analytics.
2.	Apply the basic principles of relational database design and its relation to big data analytics.
3.	Evaluate and discuss database systems and big data analytics issues with a professional approach in a written documentation and oral presentation.
4.	Demonstrate an ability to work independently and in a group.

The Learning Outcomes in this course also help you to achieve some of the overall Program Learning Goals and Outcomes for all undergraduate students in the Business School. Program Learning Goals are what we want you to BE or HAVE by the time you successfully complete your degree (e.g. 'be an effective team player'). You demonstrate this by achieving specific Program Learning Outcomes – what you are able to DO by the end of your degree (e.g. 'participate collaboratively and responsibly in teams').

For more information on the Undergraduate Coursework Program Learning Goals and Outcomes, see Part B of the course outline.

Business Undergraduate Program Learning Goals and Outcomes

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1. Knowledge: Our graduates will have in-depth disciplinary knowledge applicable in local and global contexts.
You should be able to select and apply disciplinary knowledge to business situations in a local and global environment.

2. Critical thinking and problem solving: Our graduates will be critical thinkers and effective problem solvers.
You should be able to identify and research issues in business situations, analyse the issues, and propose appropriate and well-justified solutions.

3. Communication: Our graduates will be effective professional communicators.
You should be able to:
  a. Prepare written documents that are clear and concise, using appropriate style and presentation for the intended audience, purpose and context, and
  b. Prepare and deliver oral presentations that are clear, focused, well-structured, and delivered in a professional manner.

4. Teamwork: Our graduates will be effective team participants.
You should be able to participate collaboratively and responsibly in teams, and reflect on your own teamwork, and on the team's processes and ability to achieve outcomes.

5. Ethical, social and environmental responsibility: Our graduates will have a sound awareness of the ethical, social, cultural and environmental implications of business practice.
You should be able to:
  a. Identify and assess ethical, environmental and/or sustainability considerations in business decision-making and practice, and
  b. Identify social and cultural implications of business situations.

The following table shows how the Course Learning Outcomes support the Program Learning Outcomes. The table also shows where the Course Learning Outcomes are assessed:

Program Learning Goals and Outcomes		Course Learning Outcomes	Course Assessment Item
This course helps you to achieve the following learning goals for all Business undergraduate students:		*On successful completion of the course, you should be able to:*	*This learning outcome will be assessed in the following items:*
1	Knowledge	Investigate emerging technologies and recent trends in database design to support big data analytics. Apply the basic principles of relational database design and its relation to big data analytics. Evaluate and discuss database systems and big data analytics issues with a professional approach in a written documentation and oral presentation	▪ Assignment ▪ Exam

2	Critical thinking and problem solving	Apply the basic principles of relational database design and its relation to big data analytics. Evaluate and discuss database systems and big data analytics issues with a professional approach in a written documentation and oral presentation	▪ Assign. A+B ▪ Exam ▪ Lab exercises
3a	Written communication	Evaluate and discuss database systems and big data analytics issues with a professional approach in a written documentation and oral presentation	▪ Assign. A+B
3b	Oral communication	Evaluate and discuss database systems and big data analytics issues with a professional approach in a written documentation and oral presentation	▪ Assign. A+B
4	Teamwork	Demonstrate an ability to work independently and in a group	▪ Assign. A+B
5a	Ethical, social and environmental responsibility	(Not a focus of this course)	
5b	Social and cultural awareness	(Not a focus of this course)	

3 LEARNING AND TEACHING ACTIVITIES

3.1 Approach to Learning and Teaching in the Course

The teaching strategies will include lectures, laboratories, active/experiential learning and cooperative learning.

3.2 Learning Activities and Teaching Strategies

At university, the focus is on self-study and self-directed search for knowledge. Lectures, labs, textbooks, exams and other resources are provided to structure students' self-learning. Students are expected to attend all lectures, complete all lab exercises, and read all required readings so to fully grasp and appreciate the concepts of data management and big data infrastructures.

Self-Study: Students need to take the initiative to self-learn the relevant contents throughout the course. Learning is not achieved through attending formal lectures and labs but is nearly exclusively achieved through self-initiated learning. Formal lectures, labs, and the textbook can only provide the context, structure, and resources for this learning. The practical engagement with the material in self-study or in group work and informal communications with peers are the crucial elements of the learning. Students need to revise lectures; complete assignments and study for exams. Students are responsible for their learning style and goals and to make a concerted and timely effort to study for this course.

Lecture: Each lecture will provide an overview of the topic at hand and will focus on explaining topics, concepts, and issues. The role of the lecture is to help students understand the context of the topic as well as walk them through difficult points. There will continuous opportunities to ask questions and actively participate in the lectures. In this course, the lecture focuses topics of enterprise-level data management as well as big data.

Lab: The labs provide practical assistance through hands-on work on databases. The labs focus on using and managing database us an industry standard DBMS such as Oracle (or equivalent). There will be hand-out material supporting the lab. The database and application design assignment of this course is closely linked to the lab and includes an oral presentation in the lab. The lab tutors are responsible for all lab sessions and technical questions regarding the database and application project. Students should always refer to your lab tutor first with problems regarding the lab or the database and application project. For this course and assignment, students need to use the Oracle (PL-)SQL query language and Oracle APEX (or equivalent, if agreed with teaching team).

4 ASSESSMENT (PRELIMINARY)

4.1 Formal Requirements
To receive a pass grade in this course, you must meet **all** of the following criteria:
- Attain an overall mark of at least 50%.
- Attend at least 80% of all classes.
- Attain a satisfactory performance in each component of the course. A mark of 45% or higher is normally regarded as satisfactory.
- Attain a mark of at least 45% in the final exam.

The School reserves the right to scale final marks to a mean of 60%.

4.2 Assessment Details

Assessment Component	Weight	Length	Submission/Due Date
1. Lab Exercises	10%	–	Weekly (weeks 2-7) in labs
2. Assignment (Project)	10% – Part A, written report	Max. 8000 words (~16 pages) + digital component	PDF submission via Moodle, Fri of week 5 (see assignment document)
	15% – Part B, written	Max. 8000 words (~16 pages) + digital component	PDF submission via Moodle, Fri of week 11 (see assignment document)
	5% – oral presentation	15 min	In week 12/13 labs
3. Final Exam	60%	2 hours	Exam period
Total	100%		

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Assessment Component: Lab Exercises

The first six labs (week 2 to week 7) are set to complete a set of lab exercises individually and a total of 10% of your overall marks is allocated to them. You are required to complete each of these six lab sections in due week and your tutor will check your work at the end of each lab. Lab sessions in week 8 to week 11 are set for you to complete your database system design and/or analytics project. Your lab instructor is responsible for all laboratory sections and your database project. Students with problems regarding the laboratory and database project should always refer to their lab instructor first.

Assessment Component: Assignment A+B (Project)

An important experiential component of the course is the completion of a database system design and/or analytics project in a group of 5 (4 or 6 to fill) students. This assignment provides an opportunity for students to work in groups on an implementation project. This assignment also helps to improve your critical thinking, problem solving, communication, teamwork and leadership and professional skills. The project should help students to develop competency in regard to database concepts, implementation and analytics.

The project is divided into two phases. Part A (phase 1) requires the development of a database project proposal based on a domain assigned by the LIC. Part B (phase 2) consists of an implemented web application that interacts with the database. System documentation is important. The second phase includes an oral presentation of the project.

We will use Oracle and Oracle APEX (or equivalent) as the default platforms to implement the user interface of the projects. The main emphasis in class is teaching database concepts with some hands-on instructions. It is the responsibility of students to self-study the details of the Oracle implementation. The ability to learn is an important skill for IS professionals.

The groups will be set up in the labs and Moodle, the process will be explained in class. Please note that each student is responsible for finding and enrolling in a group, teaching staff will not "allocate" students to groups. Failure to enrol in a group will lead to the student having to complete the full group assignment alone.

Between- and within-group peer review is used for this assignment. Peer review increases responsibility, autonomy, and advances deeper understanding. Each project group will be assigned to evaluate other projects. Based on the deliverables, project groups are required to provide comments and recommend ratings. The peer review process is anonymous. The teaching team will evaluate the peer reviews and the deliverables and finalize marks.

The assignment requirements document will be available on the course website on Moodle. The LIC will provide further advice on the assignment in the lecture.

Assessment Component: Exam

A final exam will be run in the exam period. The final exam will cover all topics in this course. The aim of the final examination is to enable students to demonstrate to the examiner that they have achieved all learning outcomes of the course and have achieved a level of competency with advanced database topics, and the capacity to apply the competency critically and analytically in an organisational environment. The LIC will provide further advice on the exam in the lecture.

4.3 Assignment Format

Assignments need to be submitted in the standard UNSW format. Especially, the assignment needs to include a signed standard UNSW assignment cover sheet. The signatures need to be authentically signed (not typed) on the cover sheet. A missing cover sheet or a cover sheet not authentically signed will result in a penalty of 10% (of the maximum marks available for assignments). No marks will be released until the signed cover sheet has been received. Assignments need to be submitted in PDF format. Use of another file format will result in a penalty of 10%. If time assignment includes digital/coding components, then such components are to be included in the form of a single ZIP file in the same submission. Use of another file format will result in a penalty of 10%. Assignments may be screened with plagiarism-detecting software. The submission of non-original materials will be considered plagiarism and will be pursued. Further details on the format for each assignment are provided with the respective assignments requirements document.

4.4 Assignment Submission

Assignments are to be submitted via Moodle on or before the day of the deadline. Late submissions of assignments are to be avoided, disrupt the course timelines and are a sign of poor time management. The late submission of assignments carries a penalty of 10% of the awarded marks for that assignment per day of lateness, including weekends and public holidays. For example, a 70 marking would be reduced by 7 marks per day of lateness. Assignments submitted late will miss marked components that are in their nature dependent on timely submission, especially peer review. An extension of time to complete an assignment may be granted by the LIC in the case of illness or misadventure. Applications for an extension need to be made to and approved by the LIC by email or in person three days before the due date. Students need to send appropriate evidence such as medical certificates, accident reports etc. with their application. Please note that workload, work commitments, computer failures and technical issues in the submission process are not insufficient grounds for an extension. For group assignments: groups are expected to plan ahead and to being able to balance out a missing member without an extension. An extension is unlikely to be granted for groups.

All applications for special consideration (for major assignments or the final exam, there is no special consideration for minor in-class assessment tasks) must be made following the guidelines in the UNSW A-Z Student Guide. See the following URL: https://student.unsw.edu.au/special-consideration.

Quality Assurance
The Business School is actively monitoring student learning and quality of the student experience in all its programs. A random selection of completed assessment tasks may be used for quality assurance, such as to determine the extent to which program learning goals are being achieved. The information is required for accreditation purposes, and aggregated findings will be used to inform changes aimed at improving the quality of Business School programs. All material used for such processes will be treated as confidential.

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5   COURSE RESOURCES

The textbook for this course is:

**Connolly and Begg – Database Systems: A Practical Approach to Design,
Implementation, and Management (6e)
Pearson Education, Harlow, UK
(ISBN-13: 9781292061184)**

The latest edition is recommended. However, students typically find older editions of the books sufficient for the course. Additional course materials may be provided in class and on the **course website on Moodle**.

General introduction texts/books regarding PL/SQL and Big Data may be useful (are recommended, but not required).

6   COURSE EVALUATION AND DEVELOPMENT

Each year feedback is sought from students and other stakeholders about the courses offered in the School and continual improvements are made based on this feedback. UNSW's myExperience survey is one of the ways in which student evaluative feedback is gathered. In this course, we will seek your feedback myExperience responses and through direct feedback from students to the LIC in class.

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7   COURSE SCHEDULE (PRELIMINARY)

LECTURE SCHEDULE: INFS2608 Data Management & Big Data Infrastructure (2017-S1) Lecture: **Thu 4 – 6 pm, Rex Vowels Theatre**				
Week	**Lecture Topic**	**Reading**	**Lab Topic**	**Comment**
Week 1 27 Feb	Introduction, Relational Data and Big Data	Ch. 1, 2	NO LABS	Course admin; Ass. A + B released
Week 2 6 Mar	SQL and PL-SQL	Ch. 6, 7, 8, readings	Lab 1	Group setup
Week 3 13 Mar	Database System Development Lifecycle	Ch. 10	Lab 2	Additional advice ass. A
Week 4 20 Mar	Relational Model and Relational Algebra	Ch. 4, 5	Lab 3	–
Week 5 27 Mar	Advanced Normalization	Ch. 15	Lab 4	**Ass. A due**
Week 6 03 Apr	Database Security	Ch. 20	Lab 5	**Peer review ass. A due** Additional advice ass. B
Week 7 10 Apr	Transaction Management	Ch. 22	Lab 6	*(Fri 14 Apr – no labs due to Good Friday public holiday)*
Mid-semester break: Fri 14 – Sat 22 Apr inclusive				
Week 8 24 Apr	Data and the Internet	Ch. 3, 29	Project development	–
Week 9 1 May	Data Warehousing, Mining and Analytics	Ch. 31, 34	Project development	–
Week 10 8 May	Big Data Infrastructures: Fundamentals	Readings	Project development	–
Week 11 15 May	Big Data Infrastructures: Hadoop Ecosystem	Readings	Project development	**Ass. B due**
Week 12 22 May	Review, Exam Preparation	–	**Group Presentations**	**Peer review ass. B** additional exam advice
Week 13 29 May	NO LECTURES	–	**Group Presentations**	Exam consultation
Exam period: 13 Jun – 26 Jun				

This schedule is subject to change. Changes will be announced on Moodle.