COMP1556 (2018/19)	**Database Applications Technologies**	**Faculty Header ID:**	**Contribution:** 100%
Course Leader: Mr. Andy Wicks	**Coursework**	**Demo Date**: Arranged by you	**Deadline Date:** 6th April 2019
This coursework should take an average student who is up-to-date with tutorial work approximately 50 hours. Feedback and grades are normally made available within 15 working days of the coursework deadline.			
Learning Outcomes: A. Appreciate the functions required of common business information systems. B. Understand and be able to apply appropriate development methodologies of data analysis, design and use appropriate modelling techniques for databases. C. Gather requirements and identify scope and boundaries for developing a business application. D. Map the business model to a relational schema. E. Build a database system using the integrated tools provided by a database management system. F. Use query facilities to formulate queries and manipulate the database.			

Plagiarism is presenting somebody else's work as your own. It includes: copying information directly from the Web or books without referencing the material; submitting joint coursework as an individual effort; copying another student's coursework; stealing coursework from another student and submitting it as your own work. Suspected plagiarism will be investigated and if found to have occurred will be dealt with according to the procedures set down by the University. Please see your student handbook for further details of what is/isn't plagiarism.

All material copied or amended from any source (e.g. internet, books) must be referenced correctly according to the reference style you are using.

Your work will be submitted for plagiarism checking. Any attempt to bypass our plagiarism detection systems will be treated as a severe Assessment Offence.

Coursework Submission Requirements

- **An electronic copy of your work for this coursework must be fully uploaded on the deadline date of Saturday 6th April 2019 before 23:00 using the link on the coursework Moodle page for COMP1556.**
- **For this coursework you must submit a single PDF document. In general, any text in the document must not be an image (i.e. must not be scanned) and would normally be generated from other documents (e.g. MS Office using "Save As ... PDF"). An exception to this is hand written mathematical notation, but when scanning please ensure the file size is not excessive.**
- **There are limits on the file size (see the relevant course Moodle page).**
- **Make sure that any files you upload are virus-free and not protected by a password or corrupted otherwise they will be treated as null submissions.**
- **Your work will not be printed in colour. Please ensure that any pages with colour are acceptable when printed in black and white.**
- **Please ensure that all screen shots are readable. Pixelated images that cannot be read easily will be disregarded and their contents will score zero.**
- **You must NOT submit a paper copy of this coursework.**
- **All coursework must be submitted as above. Under no circumstances can they be accepted by academic staff.**

The University website has details of the current coursework regulations, including details of penalties for late submission, procedures for extenuating circumstances, and penalties for assessment offences. See http://www2.gre.ac.uk/current-students/regs.

Briefing

This coursework should be completed as a pair (i.e. group of 2). You can however opt to work alone if you prefer. You must be ready to demonstrate your work as a pair to your peers on the dates specified by your course coordinator.

The aim of this assignment is to undertake a range of tasks involved in the analysis, design and build of a database structure and applications for a database system. Where information is not available you should make reasonable assumptions. Make sure that you include all business constraints that have been captured during the analysis phase.

Specification

The Wired Hospital

A large, forward thinking private hospital, has realised that collecting data on patient and medical care could improve efficiency and help patients. They intend to create wrist bands for patients and staff with specialised chips in them which would allow sensors, placed throughout the building, to track in which sector (a ward, office, operating theatre, etc.) that chip is located. Larger pieces of equipment such as beds, monitors and drug trolleys would also have these chips inserted. The hospital will need a well-designed database to hold and analyse the data and that is the task that you have been assigned.

A patient is given one of these wrist bands when they are admitted. The chip in the wrist band has a unique number which is assigned to that patient for their stay. That wrist band number is then linked to the patient record (a patient record will have its own unique ID, but you should not create patient records because that system exists already) so that the band and the medical services can be tracked. Were a patient to be re-admitted then they would get a new wrist band and that number would also be linked to the patient record, so a patient may have many wrist band numbers. This will allow staff and visitors to locate patients more quickly.

Medical staff could then register the patients that they treated using a small scanner.

Doctors, nurses, trainees, etc. would also have bands, but they would keep theirs throughout their time at the hospital. Your design should allow a member of staff to have more than one band over their time because bands could break, get lost or just malfunction. The old band number should not be overwritten because the data linked to the old band would be lost.

The equipment will also be tracked so that it can be located easily by staff and, where appropriate, linked to helping a specific patient (for example, bed and patient or heart monitor and patient). This will allow a more efficient schedule for replacements (which will get a new chip) to be developed.

Your design should allow new types of job, locations and equipment to be added, should that be necessary.

Requirements
Create the conceptual ERD, physical ERD, database (with test data) and queries to support the car manufacturer.

Sample Queries
The following database queries are required to be displayed on screen (i.e. produce the SQL code only, no form or report). Choose one of the sets of queries to answer. If you are in a pair, you cannot choose the same set of queries as your partner.

List A

A1. Joining tables
List the doctors who worked on each patient.

A2 ORDER BY and Runtime entry
List the patients on a particular ward (entered at runtime) in family name/forename alphabetical order on a particular date (entered at runtime).

A3 GROUP BY ... HAVING
List those patients treated by each nurse grouped by the family name of the nurse for those patients admitted in the last year.

A4 Sub-queries
List those beds that each doctor has not visited ordered by the ward in which the bed is located.

List B

B1. Joining tables
List the equipment used on each patient.

B2 ORDER BY
List the nurses working on a particular ward (entered at runtime) in family name/forename alphabetical order on a particular date (entered at runtime)..

B3 GROUP BY ... HAVING
List those patients using a particular bed grouped by the bed ID for those patients admitted in the last year.

B4 Sub-queries
List those wards that each trainee has not visited ordered by the family name/forename of the trainee.

Deliverables

Your electronic submission should include:

- You should upload a report which includes all the deliverables (D1, D2, D3, D4, D5 and D6). You may find it easiest to use the template provided.

All deliverables are listed below:

D1. Make a clear statement of any assumptions that you make about the data, in particular, noting any information that you believe should be included, but is not mentioned in the outline specification or any assumptions that affect the design of your database.

D2. One A4 page containing the conceptual data model diagram (i.e. an entity relationship diagram using consistently either Chen or Crows Foot notation showing:

- Relevant entity types
- The primary key for each entity (underlined)
- Relationship types with role names (plus relationship attributes if any)
- Any sub-classes (showing disjoint or overlapping) which would make the diagram more informative.
- Structural constraints on each relationship (both cardinality and participation)

D3. For the above model, produce the physical data model. The model represents your mapping from the conceptual model into a relational schema and should show:

- All entities and their relationships to the other entities with their cardinalities.
- Resolve any sub-classes and M-M relationships as necessary.
- For each prospective table identify the primary key and any necessary foreign keys **then** add all appropriate fields.
- Identify the data types for each field.
- Generate the tables – either by hand or using a database designer tool.

D4. Create a database for the above schema using the Oracle DBMS using SQL and populate each table with typical records to clearly demonstrate the application results. Create an insertion plan and then use an on-line data generation site to generate a suitable quantity of test data for each table. Give the SQL code for the creation scripts and samples of the population scripts. You should populate the database with sufficient data to clearly and unambiguously demonstrate all queries submitted.

D5. The SQL queries used to fulfil the four queries from either List A or List B. Show the output results (i.e. screen dumps of your executed queries).

D6. Include a **detailed** evaluation of your work as well as showing the marks you expect to get for each of the areas shown below.

Marking Scheme

	Out Of	Awarded
Assumptions	5	

Conceptual Model	Out Of	Awarded
Identifying necessary main entities	5	
Identifying valid PKs	2	
Identifying sub-classes and their type	8	
Identifying relationships	5	
Cardinality of relationships	5	
Participation constraints of relationships	5	
Sub-total	30	0

Physical Model	Out Of	Awarded
Appropriate list of attributes	4	
Sub-classes and M-Ms resolved	8	
The correct placement of FKs	4	
Proof normalisation was carried out	4	
Sub-total	20	0

Database Implementation	Out Of	Awarded
Population plan and DB creation	4	
Population implementation	4	
Sub-total	8	0

Coursework Queries	Out of	List A	List B
Query 1 - Joins	6		
Query 2 - ORDER BY and Runtime input	8		
Query 3 - GROUP BY ... HAVING	8		
Query 4 - Sub-queries	10		
Sub-total	32	0	0

	Out Of	Awarded
Evaluation	5	

	Out Of	Awarded
Total	100	