**UNIVERSITY OF WOLVERHAMPTON**

**FACULTY OF SCIENCE AND ENGINEERING**

**7CI006 Data Management**

**PG INYR UM1 2021/22 Portfolio Details**

The portfolio is made up of three components:

|  |  |  |
| --- | --- | --- |
| **Type** | **Learning Outcome** | **Percentage** |
| Assessment 1 – The Technical Academy Case Study.  See separate description  Hand-in date: **Monday 06 December 2021** 14:00HRS | LO1, LO3 | 45% |
| Assessment 2 – Essay on a particular topic.  See separate description  Hand-in date: **Monday 13 December 2021** 14:00HRS | LO2, LO3 | 45% |
| Assessment 3 – Practical Workshop attendance & work management  You will be monitored with a weekly sign off between teaching week 1 and week 10 You gain a mark per week, no late marks allowed. Final date: **Monday 06 December 2021.** You are expected to follow the workbooks and exercises provided and show your evidence to a tutor weekly at workshops only. | LO2 | 10% |
| RESIT: **Resit deadline:** **Monday 11th April 2022** 14:00HRS (PG SEM1 Resit week) and/or **Monday 11th July 2022** 14:00HRS |  |  |

**Note, no extensions will be granted for this portfolio. If you fall into difficulties because of unforeseen problems you may be able to ask for mitigation. In this case please contact your Course Leader to discuss it further.**

**Please note:**

All these are **individual** assignments.

Submit an electronic copy of any assessments online to Canvas.

Penalties for late submission of coursework:

* Standard University arrangements apply.

**Resit Procedure**

To pass the module you must get 50% and above in the overall portfolio. If you get less than 50% you will have to resit the module. This will involve you resubmitting the part of the portfolio that you did not pass. Feedback will be given in your marked portfolio that will confirm which part(s) you will need to redo.

Students with mitigation will have to complete the part(s) not attempted.

Ensure you check your feedback to find out if you need to resit any part of the module.

**Resit deadline:** Monday 11th April 2022 14:00HRS (PG SEM1 Resit week)

**UNIVERSITY OF WOLVERHAMPTON**

**FACULTY OF SCIENCE AND ENGINEERING**

### 7CI006 Data Management – Semester 1 2021/22

Assessment 1This is worth 45% of the Portfolio

**Hand in/UPLOAD:** Monday 06 December 2021 14:00HRS (Teaching Week 11)

You are required to develop a data model and partial implementation of a software system for The Technical Academy, it is a modern university in Central England, as detailed below.

# CASE BRIEF: THE TECHNICAL ACADEMY

## 1. Introduction

The Technical Academy operates a number of courses. There are a number of schools within the University; each school is responsible for one or more courses. A course is the property of a single school. A number of lecturers work for each school. Lecturers work for one school only. Schools operate a number of modules. A module is associated with a single school. Lecturers teach on the modules. Typically a lecturer teaches more than one module and a module is taught by more than one lecturer. A module is associated with one lecturer who is the module leader for that module. A lecturer may be the module leader for more than one module.

A course is made up of many modules and the same module may appear on many courses. A school can be responsible for a module that is taught on a course owned by a different school. Students at the University enrol on a course and take many modules. A student at any one time can only be enrolled on one course.

The University has decided to use a relational database to hold information about its modules, courses, students, etc. Systems analysis shows that following information needs to be stored by the system:

SCHOOL: School abbreviation (5 characters unique)

School name (20 characters)

Head of School

MODULE: Module number (6 characters unique)

Module name (20 characters)

School responsible for it

Module leader

LECTURER: Initials (4 characters unique within a School)

Name (20 characters)

School name

Date of Birth

Room number (8 chars)

Telephone extension (4 digit number)

Teaching band (a number between 50 and 500)

COURSE: Course code (5 characters unique)

Course name (30 characters)

Course duration (a number between 1 and 7)

School name

STUDENT: Student number (8 characters unique)

Student name (20 characters)

Email (30 characters)

Date of Birth

The system also needs to record the following:

* the overall percentage obtained by the student for each module and which academic year and semester it was taken in;
* the number of hours each lecturer spends teaching each module.

## 2. Manual Records

The following manual records are kept:

2.1 List of all students who have taken a particular module:

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| **THE TECHNICAL ACADEMY** | | | | **MODULE RECORD** | |
| *Module No:* |  | *Module Leader:* | |  |  |
| *Name:* |  | *School Responsible:* | |  |  |
| **STUDENTS** | |  |  | |  |
| *Student No* | *Student Name* | *Year* | *Occurrence* | | *Overall Percentage* |
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2.2 List of all staff by school:

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| **THE TECHNICAL ACADEMY** | | | **STAFF LIST** | |
| *School:* |  | *Head Of School:* |  |  |
| **LECTURERS** | |  |  |  |
| *Initials* | *Name* | *Room Number* | *Telephone Ext* | *Teaching Band* |
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2.3 Sample Data

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| **THE TECHNICAL ACADEMY** | | | | **MODULE RECORD** | | |
| *Module No:* | 7CI111 | *Module Leader:* | | Chris Date | |  |
| *Name:* | Databases Are Fun! | *School Responsible:* | | MaCS | |  |
| STUDENTS | |  |  | |  | |
| *Student No* | *Student Name* | *Academic Year* | *Occurrence* | | *Overall Percentage* | |
| 11123456 | Tina Turner | 2021/22 | SEM1 | | 61% | |
| 02222333 | Rod Steward | 2021/22 | SEM1 | | M0 | |
| 05121212 | Delia Smith | 2021/22 | SEM1 | | 81% | |
| 06444111 | Bruce Springsteen | 2021/22 | SEM1 | | 60% | |
| 12231321 | Leah Totton | 2021/22 | SEM1 | | 90% | |
| 10421234 | Sam Dingle | 2021/22 | SEM1 | | 72% | |
| 02222333 | Rod Steward | 2021/22 | SEM1 | | 62% | |
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| **THE TECHNICAL ACADEMY** | | | **STAFF LIST** | |
| School Name: | MaCS | Head Of School: | Boris Javid |  |
| **LECTURERS** | |  |  |  |
| *Initials* | *Name* | *Room Number* | *Telephone Ext* | *Teaching Band* |
| LE | Larry Ellison | MI111 | 1234 | 550 |
| CD | Chris Date | MI333 | 2345 | 350 |
| HD | Hugh Darwen | MA444 | 3445 | 400 |
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| **THE TECHNICAL ACADEMY** | | | **MODULE RECORD** | | |
| *Module No:* | 6WB222 | Module Leader: | | Elizabeth Patel | |
| *Name:* | Business Techniques | *School Responsible:* | | WBS |  |
| STUDENTS ON MODULE | |  |  | |  |
| *Student No* | *Student Name* | *Academic Year* | *Occurrence* | | *Overall Percentage* |
| 11123456 | Tina Turner | 2018/19 | SEM1 | | 35% |
| 09556356 | Steve Jobs | 2018/19 | SEM1 | | 89% |
| 11123456 | Tina Turner | 2019/20 | SEM2 | | 45% |
| 02222333 | Rod Steward | 2019/20 | SEM2 | | 57% |
| 05126789 | Jill Archer | 2019/20 | SEM2 | | 95% |
| 07411552 | Elvis Costello | 2019/20 | SEM2 | | 47% |
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| **THE TECHNICAL ACADEMY** | | | **STAFF LIST** | |
| School Name: | WBS | Head Of School: | Bill Gates |  |
| LECTURERS | |  |  |  |
| *Initials* | *Name* | *Room Number* | *Telephone Ext* | *Teaching Band* |
| NH | Nick Hewer | CM111 | 2111 | 450 |
| AS | Alan Sugar | CM155 | 2312 | 350 |
| KB | Karen Brady | CM212 | 2412 | 500 |
| SU | Stella Urbon | CM111 | 2134 | 200 |
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## 3. Requirements

You are required to:

* 1. Using the Oracle Developer Data Modeler tool, draw an Entity Relationship Model for The Technical Academy case study above. Explain any assumptions you have made.

**Hand-in:** The ER diagram, plus assumptions if necessary.

(40%)

* 1. Use the Data Modeler tool to map your Entity Relationship model to a set of relations.

**Hand in**: the Relational Diagram produced from the Engineering process and a copy of the **final** generated DDL script (no need to hand in any intermediate scripts you may have generated). **Highlight any additional domain constraints you have added to the tables** (primary and foreign keys are expected by default).

Include the Relational Diagram in the main body of your Part 1 document, but put the DDL script in an appendix.

Comment on any changes you made to the Relational diagram before mapping the final DDL script. Discuss why you had to make these changes (1 page maximum).

(10%)

* 1. Create and store appropriate test data in the database. Each table should have at least 6 rows, but some will have more, for example 1 School will have many Lecturers. Basically, the tables at the many end of a relationship should therefore contain more data than the relation at the one end. The test data should reflect the scenario; include some commentary on how you devised your data.

(10%)

* 1. The final design should be tested to ensure it will meet the requirements for the university. You need to devise some queries that would test the design. Think about what sort of queries would be generated by staff and students for the above scenario.

Produce 5 queries to test the above design. Overall the 5 queries must demonstrate the following concepts:

* A join;
* An aggregate function, such as COUNT, AVG, etc.;
* A selection (that is not all rows and columns are returned);
* Sorting of the data;
* A subquery

Credit will be given to queries that are not trivial, for example, *“SELECT \* FROM Tablename”* is unlikely to gain more than one mark.

Credit will be given for appropriate headings, formatting and use of substitution variables where appropriate in the SQL queries.

(30%)

* 1. In no more than 250 words, discuss:
* how rules surrounding data governance can affect an a University environment;

This should briefly discuss what data governance is and what particular issues would be applicable in a University such as above.

(10%)

Listings should demonstrate that the queries do indeed work; you will therefore need to hand in listings of the data in all your tables.

See Canvas for a sample report layout.

The above percentages are to give an indication of the weightings of the marks.

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| **Summary of requirements** | | |
| **Part** | **No of marks** | **Requirements** |
| 3.1 | 40 | Entity Relationship diagram, using the Oracle Data Modeller Tool |
| 3.2 | 10 | Relational Diagram and DDL script. Highlight any additional constraints you have added. Note, primary and foreign keys are expected by default, so these are not viewed as additional constraints. The DDL script can be put into an appendix (see the sample report on Canvas). |
| 3.3 | 10 | Test data, list the final set of data using ***SELECT \* FROM Tablename*** for each table. You do not need to include the INSERT statements, or any errors encountered whilst populating the database.  You must use the Oracle database for this assessment. 0 marks will be given if you use any other DBMS software. |
| 3.4 | 30 | 5 SQL test queries using the Oracle database. Include a sentence to describe the query, the SQL query and results. |
| 3.5 | 10 | Short report on data governance in a University environment. Ensure you reference your work. |

Note:

* Use File>Print Diagram>To Image File to create a copy of your ER or Relational Model diagram. Then insert this into your document. Ensure all your entities and relationships can be viewed on the diagram.
* For the queries and test data, ensure the data is properly formatted so it readable. For example, use the COURIER NEW font, so the data is correctly spaced.
* We do NOT need a copy of your Data Modeler files, i.e., the DMD or XML files.
* Your documentation should clearly identify any assumptions you have made.
* The above percentages are to give an indication of the weightings of the marks.

**Ensure you keep a copy of your work.**

**PLEASE NOTE:**

This assignment is intended as an individual piece of coursework. On no account should you work on the assignment in groups to produce a group answer.

Submit the assessment electronically on Canvas.

**Penalties for late submission of coursework**

Standard University rules apply.\*

# Grade Criteria

The following is given ***as a general guideline only***. Marks may vary away from this rigid framework based on the professional judgement of the module team and the overall performance of each student in attempting to accurately reflect the scenario.

70%+ The answer must correctly reflect the scenario taking into account any ***valid*** assumptions that the student may make on the assignment.

A correct entity-relationship diagram produced with appropriate constraints.

ER diagram is engineered to a relational model. DDL script produced matches the Relational diagram. Any modifications made are fully explained and documented.

A full set of SQL queries, which fully work. Excellent set of test data.

Incisive report on data governance and how it relates to a University environment that is well referenced

60-9% The answer must almost correctly reflect the scenario taking into account any ***valid*** assumptions that the student may make on the assignment.

Entity-relationship diagram produced with most of the appropriate constraints.

ER diagram is engineered to a relational model. DDL script produced matches the Relational diagram. Any modifications made are fully explained and documented.

At least 4 SQL queries fully work. Very good set of test data.

Good report on data governance and how it relates to a University environment

50-9%: The answer must correctly reflect the scenario taking into account any valid assumptions that the student may make on the assignment.

Entity-Relationship diagram produced with some of the appropriate constraints.

ER diagram is engineered to a relational model. DDL script produced matches the Relational diagram. Any modifications made are not fully explained, or documented.

At least 3 SQL queries fully work. Test data basic. Adequate report on data governance and how it relates to a University environment

40-9%: The answer meets the minimum requirements to reflect the scenario.

A barely acceptable entity-relationship diagram produced.

ER diagram is engineered to a relational model. DDL script produced matches the Relational diagram. Any modifications made are not explained, or documented.

At least two SQL queries fully work. Test data weak. Basic report, few references.

30-9%: The answer does not reasonably reflect the scenario although some good points are included.

Entity-relationship diagram produced, but has major flaws.

Mapping missing or not fully complete.

Only one SQL query attempted. Little or no test data. Poor report, few or no references.

0-29%: The answer does not reasonably reflect the scenario and has no redeeming features.

**7CI006 PG INYR UM1 2020/21**

**Assessment 2**

**Hand in/UPLOAD: Monday 13 December 2021**

**Individual report titles**

**Select one of the topics listed below.**

DESCRIPTION: Only **one** student can attempt each topic; you will be prompted for a choice of topic/allocated (depending on availability) a topic during one of the workshop sessions.

The report should contain around **1500** words and must include references, which are properly cited. You should follow any guidance given in the Research Methods module regarding referencing. In any doubt, view the Learning Centre’s guidelines on referencing:   
<https://www.wlv.ac.uk/lib/skills-for-learning/referencing/>

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| --- | --- |
| **No** | **Title** |
| 1 | Database Design - investigation of alternative approaches; discussion of advanced techniques and how they improve the design of a database. |
| 2 | SQL: review of SQL concepts; how SQL implements the relational model; advantages and disadvantages of the language. |
| 3 | SQL: advanced features - investigation of latest features in the current SQL Standard, such as multimedia support |
| 4 | Object-Relational features: why they are needed; main features; examples of use. |
| 5 | Support for XML in relational databases – what is XML, how it is managed in a database and examples of use. |
| 6 | Review of different database architectures and where they are most appropriate, e.g., client-server, n-tier, cloud computing. |
| 7 | Review of different approaches for connecting a database to the web. |
| 8 | The role of a Database Administrator – is a DBA a help or hindrance to an organisation? |
| 9 | Data Warehousing – issues in design, e.g., star and snowflake schemas |
| 10 | Data Warehousing – issues in implementing one, data cleansing |
| 11 | Data Governance and Ethics – discussion of professional, legal and ethical issues; role of a data steward and data custodian. |
| 12 | Data Quality Management Issues – discussion of how to ensure integrity and validation. |
| 13 | Document record and Content Management issues. |
| 14 | Database Security – discuss the problems involved in keeping a database secure and the possible solutions. |
| 15 | Database Auditing – why it is needed and what solutions are there. |
| 16 | Relational model: main features; how it is supported by SQL; problems of areas not supported. |
| 17 | Investigation of Application Development tools, such as SQL Developer, Apex. How do they aid the development of a database application? |
| 18 | Multi-user issues: currency control – discuss the problems involved and how they are controlled in a relational database |
| 19 | Multi-user issues: handling multiple users in a DBMS; discuss what SQL support there is for maintaining a multi-user application using shared data, such as eVision. |
| 20 | Big data. Investigation of what Big Data is and what solutions are available for its manipulation. |
| 21 | The use of databases in BioInformatics – discuss the role of a database in the BioInformatics area, including examples of use (BioInformatics students have first choice on this topic). |
| 22 | The role of Big Data in BioInformatics (BioInformatics students have first choice on this topic). |
| 23 | Safe guarding European Union (EU) personal data. Investigation of UK Data Protection Act and EU legislative laws that apply to member states to safe guard personal data. |
| 24 | Safe guarding non-EU personal data. Pick a non-EU country, such as the USA, and investigate the legislative laws that safe guard their personal data. |

**NOTE: You may be asked to present your assignment submissions for task 1 and/or task 2, in the form of a viva presentation. This will happen at the examiner/markers discretion. This consists of a short session when the lecturer will ask you questions and you need to provide an answer that is NOT read out from your report, and that demonstrates topic understanding. Not providing satisfactory answers may result in failure of the assessment(s). Therefore, please ensure you understand what you are submitting before uploading to Canvas for marking.**

**Submission of work\***

Your completed work for assignments/assessments must be uploaded on the correct Module Topic on Canvas before 14:00HRS on or before the due date. ***You must keep a copy or backup of any assessed work that you submit.  Failure to do so may result in your having to repeat that piece of work.***

**Penalties for late submission of coursework**

*Late submissions will be deducted marks according to how late it is.*

*•        Students may submit work up to 7 calendar days after the published deadline with a penalty:*

*  Up to 2 days after the published deadline - a deduction of 10% of the actual mark achieved by the student.*

*  After 2 days and up to 7 days after the published deadline - a deduction of 20% of the actual mark achieved by the student*

*•        Final mark for the assessment, after penalty has been imposed, will not fall below the minimum pass mark for that assessment*

*•        If the awarded mark is below the pass mark, prior to late submission penalty, the awarded mark will stand as the final mark.*

*•        Does not apply during resit period*

**Procedure for requesting extensions**

If you have a valid reason for requiring an extension you must request an extension using e:vision. **Requests for extension to assignment deadlines should normally be submitted at least one week before the submission deadline and may be granted for a maximum of seven days (one calendar week).**

Alternatively students can apply for self-certification of extenuating circumstances through Evision for a 7 day extension.

**Retrieval of Failure**: A pass of 50% or above must be obtained overall for the module (but not necessarily in each assessment task).

**Where a student fails a module, they have the right to attempt the failed assessment(s).**

Semester 1 resits are taken in April and July making two resit attempts for semester one. If students do not submit in the spring they can submit in July. For each assessment task the assessment guideline/brief should be consulted to exact details of what the resit will entail. Some but not all resits consist of a resit for each part of the assessment that is failed.

**Mitigating Circumstances (also called Extenuating Circumstances).**

If you are unable to meet a deadline or attend an examination, and you have a valid reason, then you will need to request via e-vision **Extenuating Circumstances.**Students can apply for self-certification of extenuating circumstances through Evision to give them 7 days extension.

**FEEDBACK of assignments:** You will be given feedback when you submit/demonstrate your work on CANVAS.

**Registration:** Please ensure that you are registered on the module. You can check your module registrations via e:Vision You should see your personal tutor or the Student Services Team or office if you are unsure about your programme of study. The fact that you are attending module classes does not mean that you are necessarily registered. A grade may not be given if you are not registered.

**Cheating**Cheating is any attempt to gain unfair advantage by dishonest means and includes **plagiarism** and **collusion.** Cheating is a serious offence. You are advised to check the nature of each assessment. You *must* work individually unless it is a group assessment.

**Cheating** is defined as any attempt by a candidate to gain unfair advantage in an assessment by dishonest means, and includes e.g. all breaches of examination room rules, impersonating another candidate, falsifying data, and obtaining an examination paper in advance of its authorised release.

**Plagiarism** is defined as incorporating a significant amount of un-attributed direct quotation from, or un-attributed substantial paraphrasing of, the work of another.

**Collusion** occurs when two or more students collaborate to produce a piece of work to be submitted (in whole or part) for assessment and the work is presented as the work of one student alone.