

## H7DWBI: Data Warehousing & Business Intelligence

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| <b>Module Code:</b>                                                          | H7DWBI                                                                                                                                |
| <b>Long Title</b>                                                            | Data Warehousing & Business Intelligence <b>APPROVED</b>                                                                              |
| <b>Title</b>                                                                 | Data Warehousing & Business Intelligence                                                                                              |
| <b>Module Level:</b>                                                         | LEVEL 8                                                                                                                               |
| <b>EQF Level:</b>                                                            | 6                                                                                                                                     |
| <b>EHEA Level:</b>                                                           | First Cycle                                                                                                                           |
| <b>Credits:</b>                                                              | 10                                                                                                                                    |
| <b>Module Coordinator:</b>                                                   | Anu Sahni                                                                                                                             |
| <b>Module Author:</b>                                                        | Anu Sahni                                                                                                                             |
| <b>Departments:</b>                                                          | School of Computing                                                                                                                   |
| <b>Specifications of the qualifications and experience required of staff</b> | Master's degree in computing or cognate discipline. May have industry experience also.                                                |
| <b>Learning Outcomes</b>                                                     |                                                                                                                                       |
| <i>On successful completion of this module the learner will be able to:</i>  |                                                                                                                                       |
| <b>#</b>                                                                     | <b>Learning Outcome Description</b>                                                                                                   |
| LO1                                                                          | Evaluate business requirements which inform the design of the decision support systems required.                                      |
| LO2                                                                          | Design Implement Extract Transform and Load processes which support the integration of diverse data into a Data Warehouse environment |
| LO3                                                                          | Produce appropriate Business Intelligence reports and queries to a Data Warehouse to address domain requirements.                     |
| LO4                                                                          | Assess concerns regarding the scalability of Decision Support Systems and develop solutions which are suitable to the domain needs.   |
| <b>Dependencies</b>                                                          |                                                                                                                                       |
| <b>Module Recommendations</b>                                                |                                                                                                                                       |
| No recommendations listed                                                    |                                                                                                                                       |
| <b>Co-requisite Modules</b>                                                  |                                                                                                                                       |
| No Co-requisite modules listed                                               |                                                                                                                                       |
| <b>Entry requirements</b>                                                    | Learners should have attained the knowledge, skills and competence gained from stage 2 of the BSc (Hons) in Data Science              |

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| Module Content & Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |                           |            |
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| Indicative Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                           |            |
| <b>Data Warehouse Concepts Ethical</b><br>Introduction to module, discussion of concepts of data, data warehouses and Business Intelligence purposes. Ethics (Traditional Ethics, Core Ethical Values, Ethics in Computing, Noteworthy social and network forces)                                                                                                                                                                                                                  |                       |                           |            |
| <b>Normalisation and denormalisation</b><br>Normal forms (UNF-5NF) distinction between unnormalised and denormalised, rationale for denormalisation                                                                                                                                                                                                                                                                                                                                |                       |                           |            |
| <b>Dimensional modelling</b><br>Dimensional modelling concept, Fact tables, choice of dimensions: attributes and richness, star&snowflake schema                                                                                                                                                                                                                                                                                                                                   |                       |                           |            |
| <b>Granularity</b><br>Coarse vs fine grained data, design choices for dimensional modelling, practical impact                                                                                                                                                                                                                                                                                                                                                                      |                       |                           |            |
| <b>OLAP</b><br>ROLAP vs MOLAP vs HOLAP, Data Cubes vs star schema, implementation issues                                                                                                                                                                                                                                                                                                                                                                                           |                       |                           |            |
| <b>ETL</b><br>Extract, Transform, Load: Data Cleansing, Data Quality, Organisational impact, prevention vs cure                                                                                                                                                                                                                                                                                                                                                                    |                       |                           |            |
| <b>Data Staging</b><br>Front room vs back room, transitive vs permanent staging                                                                                                                                                                                                                                                                                                                                                                                                    |                       |                           |            |
| <b>Data Modelling</b><br>Data mapping, dimensional and fact conformity, Data Loading (Bulk vs Refresh)                                                                                                                                                                                                                                                                                                                                                                             |                       |                           |            |
| <b>Business Intelligence Reporting</b><br>Data Visualisation refresh, Operational vs Informational reporting, Information density, Information access cost                                                                                                                                                                                                                                                                                                                         |                       |                           |            |
| <b>Business Intelligence Implementation</b><br>Human-oriented design, user testing, expert vs novice users, domain vs technology expertise, communication with business decision makers                                                                                                                                                                                                                                                                                            |                       |                           |            |
| <b>Scalability of implementation</b><br>Brewer's Theorem, Partitioning, Query complexity, Scalability, scalability break points, Optimisation                                                                                                                                                                                                                                                                                                                                      |                       |                           |            |
| <b>Enterprise Decision Support</b><br>Domain terminology, dimensional conformity, enterprise practices and support, Continuity vs development                                                                                                                                                                                                                                                                                                                                      |                       |                           |            |
| Assessment Breakdown                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |                           | %          |
| Coursework                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |                           | 40.00%     |
| End of Module Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |                           | 60.00%     |
| Assessments                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |                           |            |
| Full Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                           |            |
| Coursework                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |                           |            |
| <b>Assessment Type:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Continuous Assessment | <b>% of total:</b>        | Non-Marked |
| <b>Assessment Date:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                            | n/a                   | <b>Outcome addressed:</b> | 1,2,3,4    |
| <b>Non-Marked:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Yes                   |                           |            |
| <b>Assessment Description:</b><br>Ongoing feedback on ongoing tutorial activities. Feedback on regular reflection.                                                                                                                                                                                                                                                                                                                                                                 |                       |                           |            |
| <b>Assessment Type:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Project               | <b>% of total:</b>        | 40         |
| <b>Assessment Date:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                            | n/a                   | <b>Outcome addressed:</b> | 1,2,3      |
| <b>Non-Marked:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | No                    |                           |            |
| <b>Assessment Description:</b><br>Long-form project which the student produces over the course of the entire semester. Student is required to access a set of large publicly accessible datasets and aggregate these data to form a cohesive data warehouse addressing specific domain questions addressed by the student. There are early milestones assessing outcomes such as data acquisition and interpretation, and later milestones including prototyping and user testing. |                       |                           |            |
| <b>Assessment Type:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Easter Examination    | <b>% of total:</b>        | 60         |
| <b>Assessment Date:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                            | n/a                   | <b>Outcome addressed:</b> | 1,2,3,4    |
| <b>Non-Marked:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | No                    |                           |            |
| <b>Assessment Description:</b><br>Terminal assessment exam taken over 3 hours with 5 questions of which the student must answer four to address the students' understanding of the underlying theories and concepts                                                                                                                                                                                                                                                                |                       |                           |            |
| No End of Module Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |                           |            |
| No Workplace Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |                           |            |
| Reassessment Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |                           |            |
| <b>Repeat examination</b><br><i>Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.</i>                                                                                                                                                                                                                                                                               |                       |                           |            |
| <b>Reassessment Description</b><br>The repeat strategy for this module is an examination. Learners will be afforded an opportunity to repeat the examination at specified times throughout the year and all learning outcomes will be assessed in the repeat exam.                                                                                                                                                                                                                 |                       |                           |            |

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| Module Workload                      |                                    |       |              |                                 |
|--------------------------------------|------------------------------------|-------|--------------|---------------------------------|
| Module Target Workload Hours 0 Hours |                                    |       |              |                                 |
| Workload: Full Time                  |                                    |       |              |                                 |
| Workload Type                        | Workload Description               | Hours | Frequency    | Average Weekly Learner Workload |
| Lecture                              | Classroom & Demonstrations (hours) | 24    | Per Semester | 2.00                            |
| Tutorial                             | Other hours (Practical/Tutorial)   | 24    | Per Semester | 2.00                            |
| Independent Learning                 | Independent learning (hours)       | 202   | Per Semester | 16.83                           |
| Total Weekly Contact Hours           |                                    |       |              | 4.00                            |

| Module Resources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
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| <i>Recommended Book Resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| <p>Kimbal, R. &amp; Ross, M.. (2013), The data warehouse lifecycle toolkit (3rd ed), Wiley Pub.</p> <p>Inmon, W. H. &amp; Linstedt, D.. (2014), Data Architecture: A Primer for the Data Scientist: Big Data, Data Warehouse and Data Vault, Indianapolis, IN, Wiley Pub.</p> <p>Inmon, W. H.. (2005), Building the data warehouse, Wiley Indianapolis, Ind.</p>                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
| <i>Supplementary Book Resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| <p>Howson, Cindi.. (2013), Successful Business Intelligence: Unlock the Value of BI &amp; Big Data (2 ed), Mcgraw-Hill Osborne Media.</p> <p>Provost, F. &amp; Fawcett, T.. (2013), Data Science for Business: What you need to know about data mining and data-analytic thinking, O'Reilly Media.</p> <p>Laberge, T.. (2011), The Data Warehouse Mentor, Practical Data Warehouse and Business Intelligence Insights, McGraw-Hill Osborne Media.</p> <p>Ponniah, P. (2012), Data Warehousing Fundamentals for IT Professionals, Wiley.</p> <p>McKnight W.. (2013), Information Management: Strategies for Gaining a Competitive Advantage with Data, Morgan Kaufmann.</p> <p>Hultgren, H.. (2012), Modeling the Agile Data Warehouse with Data Vault Volume 1), Brighton Hamilton.</p> |  |
| <i>This module does not have any article/paper resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| <i>This module does not have any other resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Discussion Note:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |