Database Systems

Information and Communications Technology

Course Number:	Co-Requisites:	Pre-Requisites:
CST2355	N/A	CST8282 and CST8215
Applicable Program(s):	**AAL:**	**Core/Elective:**
0006X01FWO - Computer Eng. Technology - Comp. Science	6	Elective
0006X03FWO - Computer Eng. Technology - Comp. Science	6	Elective
0336X01FWO - Computer Programmer	2	Core
0336X03FWO - Computer Programmer	2	Core
Prepared by:	Roly Roy, Professor	
Approved by:	Andrew Pridham, Academic Chair, ICT	
Approval Date:	Friday, August 29, 2014	
Approved for Academic Year:	2014-2015	
Normative Hours:	60.00	

Course Description

Acquire practical experience using market-leading object-relational database management systems like Oracle and MySQL. Obtain hands-on experience with advanced engineering modeling tools along with SQL, SQL scripts and programming with Oracle's PL/SQL blocks. Database concepts covered include advanced SQL, case structures, rollup and cube operations, metadata manipulation, data storage and retrieval, security and transaction control and data warehousing. Open source database software is also explored.

Relationship to Vocational Learning Outcomes

This course contributes to your program by helping you acheive the following Vocational Learning Outcomes:

0006X01FWO - Computer Eng. Technology - Comp. Science

VLO 1	Diagnose, solve, troubleshoot, and document technical problems involving computing devices using appropriate methodologies. (T)
VLO 2	Integrate multiple software and hardware components using appropriate network architecture. (T)
VLO 3	Participate in analyzing, planning, designing, and developing the architecture of computing devices and systems. (T,A)
VLO 4	Plan, install, configure, modify, test, and maintain a variety of computer systems to meet functional requirements. (T,A)
VLO 6	Analyze, build, test, implement, and maintain applications. (T,A)
VLO 7	Evaluate and document security issues associated with a variety of computing devices and propose alternatives to increase product reliability. (T)
VLO 8	Articulate, defend, and conform to workplace expectations found in technology environments. (T)

0006X03FWO - Computer Eng. Technology - Comp. Science

VLO 1	Diagnose, solve, troubleshoot, and document technical problems involving computing devices using

	appropriate methodologies. (T)
VLO 2	Integrate multiple software and hardware components using appropriate network architecture. (T)
VLO 3	Participate in analyzing, planning, designing, and developing the architecture of computing devices and systems. (T,A)
VLO 4	Plan, install, configure, modify, test, and maintain a variety of computer systems to meet functional requirements. (T,A)
VLO 6	Analyze, build, test, implement, and maintain applications. (T,A)
VLO 7	Evaluate and document security issues associated with a variety of computing devices and propose alternatives to increase product reliability. (T)
VLO 8	Articulate, defend, and conform to workplace expectations found in technology environments. (T)

0336X01FWO - Computer Programmer

VLO 1	Use documented solutions to troubleshoot problems associated with software installation and customization. (T)
VLO 2	Develop, test, document, deploy, and maintain secure program code based on specifications. (T)
VLO 3	Perform routine maintenance on a database. (T,A)
VLO 4	Apply knowledge of networking concepts to develop, deploy, and maintain program code. (T)
VLO 5	Gather and document required information and assist in an analysis of a business. (T,A)
VLO 6	Use relevant methodologies, policies, and standards to develop secure program code. (T,A)
VLO 7	Maintain effective working relationships with clients. (T)
VLO 8	Conform to workplace expectations found in information technology (IT) environments. (T)

0336X03FWO - Computer Programmer

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VLO 2	Develop, test, document, deploy, and maintain secure program code based on specifications. (T)
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VLO 7	Maintain effective working relationships with clients. (T)
VLO 8	Conform to workplace expectations found in information technology (IT) environments. (T)

Relationship to Essential Employability Skills

This course contributes to your program by helping you acheive the following Essential Employability Skills:

EES 1	Communicate clearly, concisely and correctly in the written, spoken and visual form that fulfills the purpose and meets the needs of the audience. (T,A)
EES 2	Respond to written, spoken or visual messages in a manner that ensures effective communication. (T,A)
EES 3	Execute mathematical operations accurately. (T,A)
EES 4	Apply a systematic approach to solve problems. (T,A)
EES 5	Use a variety of thinking skills to anticipate and solve problems. (T,A)
EES 6	Locate, select, organize and document information using appropriate technology and information systems. (T,A)

EES 7	Analyze, evaluate and apply relevant information from a variety of sources. (T,A)
EES 8	Show respect for diverse opinions, values, belief systems and contributions of others. (T,A)
EES 9	Interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals. (T,A)
EES 10	Manage the use of time and other resources to complete projects. (T,A)
EES 11	Take responsibility for one's own actions, decisions and consequences. (T,A)

Course Learning Requirements/Embedded Knowledge and Skills

When you have earned credit for this course, you will have demonstrated the ability to:

1.) Plan, Prepare, Install, Configure, and Use a market-leading Database Management System, Data Modeling Engineering Tools, and Open Source Software.

Identify System Requirements and configuration For a A MS Windows & Linux Installation of Oracle 11g R2 Interprise Edition.

Implement and use a successful installation of Oracle 11g R2

Learn about Popular data Modeling Tools and the important Criteria to consider when choosing the proper one for your organization.

Install and use the assigned data modeling Tool (Oracle Data Modeler)

Install and use an open source database Management System (MySQL)

2.) Develop Advanced Database Design and Normailzation

Understand the Limitations of basic concepts of the ER model and requirements to represent more complex applications using additional data modeling concepts.

Develop additional data modeling concept of Enhanced ER (EER) model such as specialization/generalization.

Identify the problems associated with relations that break the rules of not only 1NF, 2NF and 3NF, but also 4NF (BCNF - Boyce-Codd) and 5NF (PJNF - Project-Join) and understand how attributes are respresented on a form based on these levels of normalized relations.

3.) Develop advanced subjects and techniques of using the SQL database language

Perform advanced SQL queries using techniques such as CASE structures, rollup and cube operations.

learn to define a full range of database objects, such as advanced table definitions and the creation of indexes, sequences, views and others.

Obtain database object metadata from the data dictionary.

Use SQL *Plus and SQL Developer interfaces to develop complex reports and control the SQL*Plus environment.

4.) Use Oracle Procedural programming language (PL/SQL) to write programs that contain SQL statements.

Understand the structure of the PL/SQL Block, the Variables and the types.

Create Cursors, which allow PL/SQL to read the results returned by a query.

Develop Triggers, to be run automatically when a certain event occurs in the database

5.) Develope advanced Database Queries.

Use the ROLLUP and CUBE clauses to get subtotals and totals for groups of rows.

Take advantage of the analytic functions, which perform complex calculations, such as finding the top-

selling product type for each month, the top salespersons, and so on.

Use the new Oracle Database 11g PIVOT and UNPIVOT to see overall trends in large amounts of data.

6.) Understand and create users, privileges, and rolls.

Learn how system privileges allow you to perform actions such as executing DDL statements.

See how object privileges allow you to perform actions such as executing DML statements

Explore how to group privileges together into roles

7.) Explain basic data warehousing concepts.

Understand basic concepts of data warehousing

Learning Resources

• **Required** Text Book:
Database Processing, 13e
Kroenke, David M and Auer, David J.
Pearson - Prentice Hall
ISBN-13: 978-0-13-305835-2
• **Required** Software (Database Engines):
Oracle:
http://www.oracle.com/technetwork/products/express-edition/downloads/index.html

MySql:
http://dev.mysql.com/downloads/installer/5.6.html (for Windows platform)
http://dev.mysql.com/downloads/mysql/5.6.html (for non-Windows platforms)

MS SQL Server:
http://www.microsoft.com/en-ca/download/details.aspx?id=29062

- **Required**: This course is part of the mobile (laptop) program initiative at Algonquin College. Students are required to have a functioning laptop at all lecture and lab classes. The specifications for the required laptop, and additional information about the mobile program initiative, can be found at http://mlearning.algonquincollege.com.

Learning Activities

In-Class Lectures

Hands-On Labs and Applied Assignments

Discussions

Software Installations

Evaluation/Earning Credit

The following list provides evidence of this courses learning achievements and the outcomes they validate:

1.)
Lab Assignments: 50%

Plan, Prepare, Install, Configure, and Use a market-leading Database Management System, Data Modeling Engineering Tools, and Open Source Software. [CLR 1]

Develop Advanced Database Design and Normailzation [CLR 2]

Develop advanced subjects and techniques of using the SQL database language [CLR 3]

Use Oracle Procedural programming language (PL/SQL) to write programs that contain SQL statements. [CLR 4]

Develope advanced Database Queries. [CLR 5]

Understand and create users, privileges, and rolls.
[CLR 6]

Explain basic data warehousing concepts. [CLR 7]

Communicate clearly, concisely and correctly in the written, spoken and visual form that fulfills the purpose and meets the needs of the audience. [EES 1]

Respond to written, spoken or visual messages in a manner that ensures effective communication. [EES 2]

Execute mathematical operations accurately. [EES 3]

Apply a systematic approach to solve problems. [EES 4]

Use a variety of thinking skills to anticipate and solve problems. [EES 5]

Locate, select, organize and document information using appropriate technology and information systems. [EES 6]

Analyze, evaluate and apply relevant information from a variety of sources. [EES 7]

Show respect for diverse opinions, values, belief systems and contributions of others. [EES 8]

Interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals. [EES 9]

Manage the use of time and other resources to complete projects. [EES 10]

Take responsibility for one's own actions, decisions and consequences. [EES 11]

2.) Mid-Term Exam: 25%

Plan, Prepare, Install, Configure, and Use a market-leading Database Management System, Data Modeling Engineering Tools, and Open Source Software. [CLR 1]

Develop Advanced Database Design and Normailzation [CLR 2]

Develop advanced subjects and techniques of using the SQL database language [CLR 3]

Use Oracle Procedural programming language (PL/SQL) to write programs that contain SQL statements. [CLR 4]

Develope advanced Database Queries. [CLR 5]

Understand and create users, privileges, and rolls.
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Manage the use of time and other resources to complete projects. [EES 10]

4.) Final Exam: 25%

Plan, Prepare, Install, Configure, and Use a market-leading Database Management System, Data Modeling Engineering Tools, and Open Source Software. [CLR 1]

Develop Advanced Database Design and Normailzation [CLR 2]

Develop advanced subjects and techniques of using the SQL database language [CLR 3]

Use Oracle Procedural programming language (PL/SQL) to write programs that contain SQL statements. [CLR 4]

Develope advanced Database Queries. [CLR 5]

Understand and create users, privileges, and rolls.
[CLR 6]

Explain basic data warehousing concepts. [CLR 7]

Communicate clearly, concisely and correctly in the written, spoken and visual form that fulfills the purpose and meets the needs of the audience. [EES 1]

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Prior Learning Assessment and Recognition

Students who wish to apply for prior learning assessment and recognition (PLAR) need to demonstrate competency at a post-secondary level in all of the course learning requirements outlined above. Evidence of learning achievement for PLAR candidates includes:
-Portfolio
-Challenge Exam
-Performance Test

Grade Scheme

Final Grade	Mark Equivalent	Numeric Value	Final Grade	Mark Equivalent	Numeric Value
A+	90% - 100%	4.0	A	85% - 89%	3.8
A-	80% - 84%	3.6	B+	77% - 79%	3.3
B	73% - 76%	3.0	B-	70% - 72%	2.7
C+	67% - 69%	2.3	C	63% - 66%	2.0
C-	60% - 62%	1.7	D+	57% - 59%	1.4
D	53% - 56%	1.2	D-	50% - 52%	1.0
F	0% - 49%	0	FSP	0	0

Other Information

Students are required to respect the confidentiality of employer, client and/or patient information, interactions, and practices that occur either on Algonquin College premises, or at an affiliated clinical/field/co-op placement site. Concerns regarding clients, patients, and/or employer practices are to be brought to the attention of the program coordinator, or designated field/clinical/co-op placement supervisor so that they may be resolved collaboratively. Such concerns are not to be raised publically either verbally, in writing, or in electronic forums. These matters are to be addressed through established program communication pathways.

Course Related Information

This course is part of the mobile (laptop) program initiative at Algonquin College. Students are required to have a functioning laptop at all lecture and lab classes. The specifications for the required laptop and additional information about the mobile program initiative can be found at http://mlearning.algonquincollege.com.

Laboratory attendance is highly recommended but not compulsory, except where you are required to submit or demo your exercise and/or assignment in-person. If a demo is required and you are absent for it then you will receive 0 for this component of the deliverable. Additionally, absence from three or more laboratory sessions will result in an email being sent to your Academic Advisor for follow-up. Students are responsible for keeping a record of the number of laboratory sessions they have missed.

Submissions of lab exercises and / or assignments is mandatory. Late submission of exercises and/or assignments will be penalized upto 100%.

Non-submission of five or more lab exercises and / or assignments will result in a final grade of "F". Any missed evaluation points will result in a grade of "0". In the case of a documented emergency the professor, in consultation with the Chair, will determine how the marks will be made up and/or final grade adjusted.

The Information and Communications Technology Department requires that all course assignments (homework exercises, laboratory work, projects, etc) be submitted by students using a standard which could be specific to one or more courses. Professors will ensure, at the beginning of the term, that students are advised of the exact details of these course specific submission requirements. Professors will also post them online alongside the course outline. Student submissions that do not meet the course published submission standards may not be marked, and may incur
a penalty of up to 100% of the submission mark.

In order to pass the course, the student must have a grade of at least 50% or “D-” on tests and final exam combined, as well as on the lab exercises and assignments component.

Labs and assignments will not be included in the final grade unless the student achieves at least a grade of at least 50% or “D-” on each of the first three factors combined. (Students who have a failing grade on the combined tests and the exam will receive a grade of “F”.)

All students are required to write the final exam. There are no provisions for “making up” a missed final exam. If, as a result of being off-track in your program or some unforeseen circumstance, you note that there is a scheduling conflict in your final exam schedule, it is your responsibility to alert your course professor no later than one week before final exams start, to allow for any special arrangements.

Department Related Information

STUDENT ACADEMIC RESPONSIBILITIES

Each student is responsible for:
• Knowing the due dates for marked out-of-class assignments.
• Attending all classes and knowing the dates of in-class marked assignments and exercises.
• Maintaining a folder of all work done in the course during the semester for validation claims in cases of disagreement with faculty.
• Keeping both paper and electronic copies of all assignments, marked and unmarked, in case papers are lost or go missing.
• Regularly checking both Blackboard announcements as well as one's Algonquin e-mail account for important messages from both professors and college administration.
• Participating in on-line and classroom exercises and activities as required.
• Retaining course outlines for possible future use to support applications for transfer of credit to other educational institutions.

Harassment/Discrimination/Violence will not be tolerated. Any form of harassment (sexual, racial, gender or disability-related), discrimination (direct or indirect), or violence, whether involving a professor and a student or amongst students, will not be tolerated on the college premises. Action taken will start with a formal warning and proceed to the full disciplinary actions as outlined in Algonquin College Policies - HR22 and SA07.
Harassment means one or a series of vexatious comment(s) (whether done verbally or through electronic means), or conduct related to one or more of the prohibited grounds that is known or ought reasonably to be known to be unwelcome/unwanted, offensive, intimidating, derogatory or hostile. This may include, but is not limited to: gestures, remarks, jokes, taunting, innuendo, display of offensive materials, offensive graffiti, threats, verbal or physical assault, stalking, slurs, shunning or exclusion related to the prohibited grounds.

For further information, a copy of the official policy statement can be obtained from the Student Association.

Violation of the Copyright Act
General – The Copyright Act makes it an offence to reproduce or distribute, in whatever format, any part of a publication without the prior written permission of the publisher. For complete details, see the Government of Canada website at http://laws.justice.gc.ca/en/C-42 . Make sure you give it due consideration, before deciding not to purchase a textbook or material required for your course.

Software Piracy - The Copyright Act has been updated to include software products. Be sure to carefully read the licensing agreement of any product you purchase or download, and understand the terms and conditions covering its use, installation and distribution (where applicable). Any infringement of licensing agreement makes you liable under the law.

Disruptive Behaviour is any conduct, or threatened conduct, that is disruptive to the learning process or that interferes with the well being of other members of the College community. It will not be tolerated. Members of the College community, both students and staff, have the right to learn and work in a secure and productive environment. The College will make every effort to protect that right. Incidents of disruptive behaviour must be reported in writing to the departmental Chair as quickly as possible. The Chair will hold a hearing to review available information and determine any sanctions that will be imposed. Disciplinary hearings can result in penalties ranging from a written warning to expulsion.

For further details, consult the Algonquin College Policies AA32, SA07 and IT01 in your Instaguide.

College Related Information

Email

Algonquin College provides all full-time students with an e-mail account. This is the address that will be used when the College, your professors, or your fellow students communicate important information about your program or course events. It is your responsibility to ensure that you know how to send and receive e-mail using your Algonquin account and to check it regularly.

Centre for Students with Disabilities (CSD)

If you are a student with a disability, it is strongly recommended that you identify your needs to the professor and the Centre for Students with Disabilities (CSD) by the end of the first month of the semester in order that any necessary support services can be arranged for you.

Academic Integrity* & Plagiarism*

Adherence to acceptable standards of academic honesty is an important aspect of the learning process at Algonquin College. Academic work submitted by a student is evaluated on the assumption that the work presented by the student is his or her own, unless designated otherwise. For further details consult Algonquin College Policies AA18 http://www3.algonquincollege.com/directives/policy/academic-discipline/ and AA20 http://www3.algonquincollege.com/directives/policy/plagiarism/

Student Course Feedback*

It is Algonquin College's policy to give students the opportunity to complete a course assessment survey in each course that they take which solicits their views regarding the curriculum, the professor and the facilities. For further details consult Algonquin College Policy AA25 http://www3.algonquincollege.com/directives/policy/course-assessment/

Use of Electronic Devices in Class*

With the proliferation of small, personal electronic devices used for communications and data storage, Algonquin College believes there is a need to address their use during classes and examinations. During classes, the use of such devices is disruptive and disrespectful to others. During examinations, the use of such devices may facilitate cheating. For further details consult Algonquin College Policy AA32 http://www3.algonquincollege.com/directives/policy/use-of-electronic-devices-in-the-academic-environment/

Transfer of Credit

Students, it is your responsibility to retain course outlines for possible future use to support applications for transfer of credit to other educational institutions.

Note: College policies (previously called directives) are under review and redesign. The term *directives* is being retired. Students, it is your responsibility to refer to the Algonquin College Directives/Policies website for the most current information available at http://www3.algonquincollege.com/directives/

Legend

Terms

-ALO: Aboriginal Learning Outcome
-Apprenticeship LO: Apprenticeship Learning Outcome
-CLR: Course Learning Requirement
-DPLO: Degree Program Learning Outcome
-EES: Essential Employability Skill
-EOP: Element of Performance
-GELO: General Education Learning Outcome
-LO: Learning Outcome
-PLA: Prior Learning Assessment
-PLAR: Prior Learning Assessment and Recognition
-VLO: Vocational Learning Outcome

Assessment Levels

-T: Taught
-A: Assessed
-CP: Culminating Performance