

Vanier College
Faculty of Science and Technology
Computer Science Department

Course Title: System Development **Semester:** H-22
Course Number: 420-436-VA, Section 00001-00002 **Teacher:** Alex Vilvert
Office hours: By sending a message in Omnivox (MIO).
Ponderation: Lecture 2, Lab 5, Homework 3 hours/week
Weekly schedule: As advertised on Léa
Pre-requisites: 420-311-VA – Internet Programming, 420-331-VA – Application Development 1 (Desktop)

Program Component :

This course explores the process of developing real-world information systems. The team projects that are central to the course allow students to demonstrate that they have synthesized the materials covered in the courses leading up to this course, including Internet Programming and Application Development 1, and to have an opportunity to participate in the development of a real commercial system. This course prepares students for future project-based courses, including the final semester internship.

Course Description:

In this course, students study system development, which emphasizes the steps involved in planning, developing, and implementing a business information system including the specification, analysis and design of a database application, and an appropriate user interface. System development topics will include project management together with relevant topics for designing the database application such as information gathering, requirement specification, as well as data modelling and design. Students will work in teams on two semester-long projects leading to the design and implementation of a prototype database application, and the documentation of the development process.

Course Topics / Content:

- Set up, manage, and maintain a project team.
- Develop, follow, evaluate and update a project plan.
- Basic business concepts
- Social responsibility in system design
- Use Cases and the UML to model an existing information system
- Gather requirements using interviews and existing forms and documents
- Record requirements in User Stories
- Database design and ER diagrams
- User interface design
- Testing, particularly acceptance tests
- From the initial analysis and user requirements design a prototype of the application
- Implement some aspects of the prototype to demonstrate its validity

Competencies:

The student should be able to achieve the following competency by the end of the course:

- 00SY: Collaborate in the design of applications

Course-level Learning Outcome:

Students will learn a process for designing and developing real-world information systems by collaborating on the design and implementation of an application for a client.

Learning outcomes:

Students will be able to do the following, working in teams:

1. Develop a project plan for a project that documents the process of building the prototype information system.
2. Document the business domain and business environment in which the client operates and prepare structured interviews to elicit missing information.
3. Analyze the existing information system and build a model of the existing information system.
4. Identify a business problem, determine client and system requirements to resolve that problem, and record these requirements
5. Produce prototypical user interfaces and obtain the client's feedback.

6. Design an appropriate database to support the application.
7. Implement selected features of the design using appropriate software architecture and modify the implementation according to client feedback.
8. Language skills will account for a minimum of 10% of any take-home written assignment or oral presentation in which English is the language of expression.

Teaching Methods:

The entire course is taught online, using MS Teams. Lectures will be given during both class and lab times in order to introduce and discuss the concepts. Remaining course time is to be used to work on projects and for team meetings. Lectures will be given synchronously, recorded and be made available asynchronously. The instructor will be available during all scheduled lab and lecture times for individual and team consultations, as well as by appointment.

Webcams:

This course requires students to turn on their webcams at the beginning of every class or lab. In conformity with commercial practice and common courtesy, webcams are also to be used during class discussions and when asking questions of the teacher.

The following is from Annex II of IPESA – Institutional Standards on the Use of Webcams:

Use of webcam during class: *If a teacher's course requires students to turn on their webcam..., it is the student's responsibility to ensure they have a working webcam for the duration of the course. The College has put in place measures to support students who are lacking the needed technology... Students registered in these classes understand that their registration is consent to the webcam requirements and must discuss any issue or request for accommodations with their teacher during the first week of classes. (Section 5.1)*

Use of Webcam: *This course requires students to have a working webcam. Classes and assessments may be conducted using MS Teams or Zoom where the teacher can require students to turn on their webcams. Students should contact the course instructor if they require accommodations or have any questions or concerns. (Section 5.3)*

Notice of video recording and sharing (Download permissible; re-use prohibited): *This course, including your participation, may be recorded on video and will be available to students in the course for viewing remotely and after each session. The teacher has the exclusive right to record live lectures. Course videos and materials belong to your teacher and the College and are protected by copyright. In this course, you are permitted to download session videos and materials for your own academic use, but you should not copy, share, or use them for any other purpose without the explicit permission of the teacher. Any contravention of these conditions of use may be subject to sanction(s) by the College under the Code of Conduct. For questions about recording and use of videos in which you appear please contact your teacher. (Section 5.4)*

Tech resources available to students: *Students who do not have access to a working webcam and are taking courses that require one are encouraged to consider the following options:*

- *Purchasing a webcam if it is within their financial means to do so;*
 - *Borrowing a webcam equipped laptop from the Learning Commons;*
 - *Making use of the webcam equipped desktop computers in any of the computer lab study spaces on campus;*
- (Section 5.7)*

Attendance:

If you do not attend a class or lab, your grade may be reduced because of not completing in-class work. You are responsible for all work, even if you are absent.

In case of absence, a medical note may be required. Students providing medical notes that are found to be fraudulent will face severe sanctions as stated in the Student Code of Discipline. The Professional unsuitability policy may also

be used to sanction the student.

Evaluation Procedures and Breakdown of Marks:

Your final grade will be determined as follows, summarized as individual work and teamwork:

Individual work:

| | |
|------------------------------|--|
| Quizzes (10) | 10% weeks 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12 (see Course Schedule) |
| Assignments (4) | 20% weeks 3 (5%), 8 (5%), 10 (5%) and 12(5%) |
| Personal journal | 3% examined periodically |
| Team leader presentations | 1% after each deliverable (see Course Schedule) |
| <u>LIA Report</u> | 16% (see below) |
| <u>Total individual work</u> | <u>50%</u> |

Teamwork:

| | |
|---------------------------------------|------------------------|
| Documentation Project mark | 35% (see below) |
| Project logbook | 1% |
| <u>LIA Prototype (Implementation)</u> | <u>14% (see below)</u> |
| <u>Total teamwork</u> | <u>50%</u> |

| | |
|--------------|-------------|
| <u>Total</u> | <u>100%</u> |
|--------------|-------------|

The **final grade** is made up of two components: individual work (50%) and teamwork (50%). In order to pass the course, students must obtain a passing grade (60%) **in each of the two components**. In conformity with the IPESA (15.2.2) “failing either component will result in a final course grade of 55%, notwithstanding the total of marks accumulated”.

Documentation Project:

The Documentation Project is broken down into seven deliverables.

Each deliverable contributes to the Documentation Project mark according to the following:

| Deliverable | Value | Due week |
|--|-------|----------|
| 1. Project plan | 10% | 4 |
| 2. Client and business domain summaries, questionnaire | 10% | 5 |
| 3. Analysis - Use cases, UML Diagrams | 15% | 7 |
| 4. Requirements - User stories | 15% | 9 |
| 5. Prototype User Interface | 15% | 11 |
| 6. DB design | 15% | 12 |
| 7. Implementation and client comments | 20% | 15 |
| Total | 100% | |

The penalty for a late deliverable is 10% per school day.

Since this is a project course, you will be evaluated on the excellence of your projects and on your contribution to them. **Failure to submit peer evaluations will result in a mark of 0 for the deliverable.**

Each deliverable will receive a mark. Individual marks will then be calculated for each deliverable taking into account how well each member of the team performed, as determined by peer evaluations by the other members of the team, according to the following formula:

Individual mark = Team Deliverable or prototype mark * Individual peer evaluation / Maximum peer evaluation
In addition to the project marks, there will be a mark accorded each team for the project logbook. Thus, the total Project mark is made up of the

Implementation Project mark (14%) + Documentation Project mark (35%) + Project logbook mark (1%) = 50%

Learning Integration Assessment (30%)

The LIA consists of 2 components: 1) the prototype of the application developed in the context of this course and 2) a report about the process of developing this prototype. The report describes the development process, focusing on the challenges faced by each student and the skills they used to address those challenges, and describes in which courses they learned those skills. Students are also asked to reflect on their experience as both members and leaders of a team.

LIA Prototype implementation (14%)

Use the MVC architecture for your implementation.

Show your file structure to the instructor and make the source code/web site available to the instructor either on a USB drive, or in a downloadable format so that a copy can be transferred to the instructor.

The implementation must:

- Have at least five records per table installed in the database.
- Have at least five screens as part of the user interface.
- Perform input error checking.
- Conform to well-established UI guidelines.
- Allow the user to
 - Search for an item, or a group of items, in the database.
 - Add data to the database.
 - Retrieve data from the database and display it on screen and print it directly to a printer.
 - Change or update data in the database.
 - Delete data in the database.
- Produce at least one nicely formatted summary report of the database contents.

The instructor will attempt to use the prototype, posing questions to each member of the team, to verify their understanding of both the implementation and the various design decisions that were taken to produce the implementation. This will be done either from a USB drive, a downloaded .zip file (using, for example, WeTransfer.com), a web site, or a shared screen in a Teams meeting.

During the demonstration, the following elements will be examined:

- (2%) Accurate analysis of client requests and requirements, based on the following elements of the prototype:
 - UI Consistency
 - > 5 records/table
 - Search for item or group
 - Add data
 - Retrieve and display data
 - Print details
 - Change a record
 - Delete a record
 - Produce a formatted summary report
- (2%) Accurate analysis of the features of the computer equipment and applications, based on the following elements of the prototype:
 - Input error checking
 - Print details
 - Produce a formatted summary report
- (2%) Choice of application development standards, methods, and best practices, based on the following elements of the prototype:
 - UI Consistency
 - Source code submitted
 - Choice of standards and methods

- (2%) Assessment of the software and hardware components to be used, based on the following elements of the prototype:
 - UI Consistency
 - Input error checking
 - Choice of hardware, software
- (2%) Appropriateness of the design, solution, and implementation techniques, based on the following elements of the prototype:
 - MVC File structure and make changes immediately
 - Input error checking
 - Choice of techniques for design, solution, and implementation
- (2%) Compliance with application development standards, methods, and best practices, based on the following elements of the prototype:
 - MVC File structure and make changes immediately
 - Source code submitted
- (2%) Accurate drafting of unit, integration, functional, or acceptance test plans, based on the final report.

If you are not present for the demonstrations scheduled for your team and for the other teams in your section, you will receive a mark of 0 for the implementation.

LIA Report (16%):

The purpose of the Learning Integration Assessment Report is for you to demonstrate that you have integrated knowledge and skills from this course and the various other courses in your program. The LIA Report must be at least 6 pages long, double-spaced, 12 pt. Times Roman, not including any diagrams you may wish to include, or the bibliography, which must be in APA style.

Write a paper that addresses the following points, **using your team's project as an example**:

- 1) Describe the phases¹, stages² and steps³ your **team** actually went through while working on this project during the semester.
- 2) For each of the phases, stages and steps described in (1) above, discuss the **personal** challenges you faced, and how you overcame them.
- 3) For each of the phases, stages and steps described in (1) above, discuss the challenges the **team** faced, and how it overcame them.
- 4) For each of the phases, stages and steps described in (1) above, discuss which skills you used, and **in which CEGEP courses** you learned those skills. If you learned these skills outside of CEGEP, explain where you learned them.
- 5) For each of the phases, stages and steps described in (1) above, discuss what you learned during that phase, stage or step.
- 6) Discuss what you have learned about working in a team based on your experience both in this course and in other courses you have taken so far in the program. Use specific examples.
- 7) Use your personal logbook, the team logbook, and the various deliverables you worked on to complete the LIA Report. You may NOT, however, work on the LIA Report with anyone else.
- 8) Present the LIA Report with a suitably formatted cover page.
- 9) Please remember that if the reader cannot understand what you have written (e.g., because of poor spelling and grammar), then it will be difficult for you to pass.

¹ Phase: a part or step in a process: one part in a series of related events or actions, <http://www.merriam-webster.com>

² Stage: a particular point or period in the growth or development of something, <http://www.merriam-webster.com>

³ Step: an action, proceeding, or measure often occurring as one in a series, <http://www.merriam-webster.com>

Your LIA Report **could** have the following sections:

Introduction

First phase *Give it a name*

Description of the phase
 Personal challenges and how I overcame them
 Team challenges and how we overcame them
 Skills used and when and where I learned them
 What I learned during this phase

Second phase *Give it a name*

Description of the phase
 Personal challenges and how I overcame them
 Team challenges and how we overcame them
 Skills used and when and where I learned them
 What I learned during this phase

<etc>

Last phase *Give it a name*

Description of the phase
 Personal challenges and how I overcame them
 Team challenges and how we overcame them
 Skills used, and when and where I learned them
 What I learned during this phase

Teamwork

Bibliography

The LIA Report will be evaluated according to the following rubric:

| Writing Dimensions (Weight) | Does Not Meet Expectations (1-3 points) | Meets Expectations (4-7 points) | Exceeds Expectations (8-10 points) | Score |
|--|---|---|---|-------|
| Level of detail in describing the process (3%) | Process described using vague generalities | Description is accurate, but general and missing project-specific details. | Content is thorough and accurate. Process explained using many references to project-specific details. | |
| Description of challenges and their solutions (3%) | Very few challenges and solutions noted. | Some team and personal challenges noted, with a few solutions. | Thorough discussion of all project-related challenges and solutions. Concrete examples of both team and personal challenges and how they were overcome. | |
| Lessons learned (3%) | Very few lessons identified. | A few lessons noted, but not covered in much depth. | Well-documented lessons learned, with specific project-related examples. | |
| Integration of previous courses and knowledge (2%) | Very few courses or sources of knowledge identified. | Some courses and sources of knowledge presented, but not explicit or covered in much depth. | Thorough identification of all sources of knowledge and shows how they were integrated. | |
| Observations about teamwork (2%) | Very few general statements about teamwork. | Superficial general statements about teamwork, with some specific examples. | Thorough discussion about teamwork in the student's project team. | |
| Quality of writing (3%) | Paragraphs are poorly organized; use of sections is illogical and hinders document navigation. Sentences are poorly written; there are numerous incorrect word choices and errors in grammar, punctuation and spelling. | Paragraphs are usually well-organized; use of sections is logical and generally allows easy navigation of the document. Sentences are generally well-written; there are a few incorrect word choices and errors in grammar, punctuation and spelling. | All paragraphs are well-organized; use of sections is logical and allows easy navigation through the document. Sentences are well-written; there are no incorrect word choices and the text is free of errors in grammar, punctuation and spelling. | |
| Total 16% | | | | |

For further details of the project deliverables, logbooks, and team functioning, see the document, *Team Projects*, available on Léa.

Textbook

There is no specific textbook for this course. Chapters of a forthcoming textbook are available on Léa.

Bibliography

You will find the following books and web sites helpful:

- Ashrafi, Noushin and Ashrafi, Hessam. *Object-Oriented Systems Analysis and Design*, Pearson Education, Inc, 2009.
- Cohn, Mike. *User Stories Applied: For Agile Software Development*, Addison-Wesley Professional, 2004.
- Fowler, Martin, *UML Distilled: A Brief Guide to the Standard Object Modeling Language*, Addison-Wesley Professional, 2003.
- Gothelf, Jeff and Seiden, Josh. *Lean UX: Applying Lean Principles to Improve User Experience*, O'Reilly Media, 2013.
- Patton, Jeff. *It's All In How You Slice It*. Better Software. January 2005.
http://www.agileproductdesign.com/writing/how_you_slice_it.pdf (accessed July 26, 2015).
- —. *The new user story backlog is a map*. October 20, 2008.
http://www.agileproductdesign.com/blog/the_new_backlog.html (accessed July 26, 2015).
- —. *User Story Mapping*. 1st. Sebastopol, CA: O'Reilly Media, Inc., 2014.
- Shneiderman, Ben, et al. *Designing the User Interface: Strategies for Effective Human-Computer Interaction*, Prentice Hall, 2009.

In addition, there are a number of reference documents available on Léa.

Additional Materials

It is up to you to determine how and where you will be storing your work, whether this is online or on some other medium such as a flash drive.

You will also need some 2" x 2" Post-It® notes, and you may require 3" x 5" index cards.

Mid-term statement of progress:

The college's mid-term assessment procedure will be used to provide feedback to the students.

Rules of conduct:

An important objective of this course is to develop the ability to work in a business environment. As a result particular attention will be paid to the manner in which students comport themselves.

- Use a webcam when conversing with your peers and with both business contacts and the teacher.
- Be respectful of your instructor and fellow classmates at all times.
- Proper behaviour and dress is expected from all participants.
- As a courtesy, do not talk while the instructor is talking to the class or when a student is asking a question which pertains to the class.
- Do not "surf" the Web during lectures or labs, unless directed to by your instructor.
- You are encouraged to work with other students to solve problems. However, you must complete your own assignments.

College Policies & Procedures:

It is your responsibility to be aware of the various policies and procedures governing your rights and obligations while you are attending Vanier College.

It is the student's responsibility to be familiar with and adhere to all Vanier College Policies. A summary of the course-level policies that apply in this and all other Vanier courses can be found under "Course-Level Policies"

in **Important Vanier Links** on **Omnivox**, or by following this link: <http://www.vaniercollege.qc.ca/psi/course-level-policies/>. Complete policies can be found on the Vanier College website, under [Policies](#).

In case of an Academic Complaint, students may contact any or all, of the following:

- Perry James, Department Coordinator, jamesp@vaniercollege.qc.ca
- Haritos Kavallos, Faculty Dean, kavalloh@vaniercollege.qc.ca
- the student advocacy service available in Student Services.

System Development Course Schedule (subject to revision):

Quizzes are scheduled for the first 10 to 15 minutes at the start of the class/lab period on the scheduled date. Detailed instructions will be provided by MIO to each student.

Personal journals, **team logbooks**, **assignments**, **deliverables** and the **LIA report** are due by **Email** (not MIO) by 6 p.m. on the scheduled date.

| Wk | Sec 3 | Lecture / Discussion topic | Evaluation |
|----|--------|---|---|
| 1 | Jan 19 | Learning environment, Course outline, IPESA, Student rights and responsibilities, Schedule, Projects, Software for the course: <ul style="list-style-type: none"> • Project planning s/w (MS Project, ProjetLibre) | Quiz #0 – Pre-requisites <i>Personal information form,</i> <i>Skills inventory form</i> <i>Find a potential client</i> <i>Start personal journal</i> |
| | Jan 20 | <ul style="list-style-type: none"> • Diagramming s/w (Visio ...) | <i>Find a potential client</i> |
| | Jan 21 | <ul style="list-style-type: none"> • Trello, Miro, Git | <i>Find a potential client</i> |
| 2 | Jan 26 | 1. Team organization and functioning 2. Project Management | <i>Find a potential client</i> |
| | Jan 27 | | <i>Find a potential client</i> |
| | Jan 28 | | Personal journal (1) <i>Find a potential client</i> |
| 3 | Feb 2 | 3. Basic business concepts | Quiz #1 – Teams <i>Find a potential client</i> |
| | Feb 3 | | <i>Find a potential client</i> |
| | Feb 4 | | Assignment #1: Project plan <i>Find a potential client</i> |
| 4 | Feb 9 | 4. Design and social responsibility | Quiz #2 – Project management Team logbook (1) <i>Find a potential client</i> |
| | Feb 10 | | Deliverable 1. Project plan Peer evaluations |
| | Feb 11 | | <u>Team Leader Presentation</u> |
| 5 | Feb 16 | 5. Modeling and UML: Behavioral, structural, dynamic | Quiz #3 – Design and social responsibility |
| | Feb 17 | | Personal journal (2) |
| | Feb 18 | | Deliverable 2. Client summary, business domain summary, questionnaire Peer evaluations |

| Wk | Sec 3 | Lecture / Discussion topic | Evaluation |
|----|-----------|--|---|
| 6 | Feb 23 | 6. Gathering requirements | Quiz #4 – UML <u>Team Leader Presentation</u> |
| | Feb 24 | | |
| | Feb 25 | | |
| 7 | Mar 2 | 7. User stories (theory) | Quiz #5 – Requirements |
| | Mar 3 | 7. User stories (lab) | Team logbook (2) |
| | Mar 4 | | Deliverable 3. Use cases, UML diagrams to model the existing system Peer evaluations |
| 8 | Mar 9 | 8. User Interface Design To be viewed asynchronously 8.a Ryan Singer: Design, Development 8.b Ryan Singer: Creating a web app | Quiz #6 – User stories <u>Team Leader Presentation</u> |
| | Mar 10 | | Assignment #2: Use Cases vs. User Stories |
| | Mar 11 | | |
| | Mar 14-18 | Mid-Term Break | |
| 9 | Mar 23 | 9. Database Design | Quiz #7 – MVC |
| | Mar 24 | | Team logbook (3) |
| | Mar 25 | | Deliverable 4. User stories to express the requirements to solve the business problem Peer evaluations |
| 10 | Mar 30 | 10. Testing and test plans | Quiz #8 – User interfaces <u>Team Leader Presentation</u> |
| | Mar 31 | | Assignment #3: User Interfaces |
| | Apr 1 | | Personal journal (3) |
| 11 | Apr 6 | | Quiz #9 – DB design |
| | Apr 7 | | Deliverable 5. Prototype user interface and client comments Peer evaluations |
| | Apr 8 | | <u>Team Leader Presentation</u> |
| 12 | Apr 13 | | Assignment #4: Database design |
| | Apr 14 | | Quiz #10 – Test design plans |
| | Apr 20 | | Deliverable 6. Database design Peer evaluations |
| 13 | Apr 21 | | <u>Team Leader Presentation</u> |
| | Apr 22 | | |
| | Apr 27 | | |

| Wk | Sec 3 | Lecture / Discussion topic | Evaluation |
|----|--------------------|----------------------------|--|
| 14 | Apr 28 | | |
| | Apr 29 | | |
| | May 4 | | |
| 15 | May 5 | | |
| | May 6 | | Personal journal (4) Team logbook (4) |
| | May 10 | | Deliverable 7. Implementation using MVC, client comments Peer evaluations Learning Integration Assessment report |
| | During exam period | | <u>Demonstration</u> |