# Course information

**Course title**: eCommerce **Course #**: 420-411-VA

**Section number**: 1-2 **Semester**: A-2023

**Pre-requisite:** 420-301-VA Programming Patterns and 420-311-VA Internet Programming

**Ponderation:** Every week, 2 hours theory, 3 hours lab, and 3 hours homework

**Schedule:** As seen on LÉA

**Teacher:** Ronald Raphael **E-mail:** [raphaelr@vaniercollege.qc.ca](mailto:raphaelr@vaniercollege.qc.ca)

**Office:** D-521 **Phone:** N/A

**Office** **hours:** by appointment

# Course Description

Web applications play an increasingly important role in society. In this course, students design and build data-centric Web applications that support information transactions for commercial, communication, and other purposes. Using industry-standard Web-development technologies and best practices, students are guided in the development, implementation, and deployment of relevant Web applications.

# Course’s role in the program

This course completes the exploration of transactional Web applications that has been started in Internet Programming by providing the tools to develop the code that resides on the Web application server and that interacts with a database management system or other information service as part of a complete transactional Web application.

# Statement of course competencies

Competency **00SU Develop transactional Web applications** will be developed and finalized in this course. The competency was introduced and developed in the course 420-311-VA Internet Programming.

# Course-level Learning Outcome

Develop transactional Web applications.

# Key Learning Outcomes

Program transactional Web applications following Industry best practices.

* Apply a widely used design pattern, such as MVC.
* Implement authentication.
* Apply appropriate security measures.
* Apply internationalization and localization techniques.
* Implement database transactions.
* Retrieve data from online sources, such as from Web APIs.
* Apply testing procedures such as automated testing in a Behaviour-Driven Development methodology.
* Use proper collaboration tools for development and issue-tracking.

# Required reading material (Textbook)

There is no required textbook for this course. The use of web tutorials will enable the student to learn with concrete examples. In addition, lecture notes will be made available through Omnivox, as needed.

# Bibliography

[1] *PHP and MySQL Phrasebook (Developer's Library),* Christian Wenz, 2012  
[ISBN 0321834631](http://10.1.3.12/wiki/index.php/Special:BookSources/0321834631) (ISBN-13 978-0321834638)

# Useful Websites

|  |  |
| --- | --- |
| Topic | Site URL |
| PHP, XML, JSON, ETC. | [https://www.w3schools.com](https://www.w3schools.com/)  [http://www.academictutorials.com](http://www.academictutorials.com/) |

# Required software

* XAMPP on a USB drive, see [http://www.apachefriends.org/en/xamp](http://www.apachefriends.org/en/xampp-windows.html)p[-windows.html](http://www.apachefriends.org/en/xampp-windows.html)
* Multiple Web browsers: Mainly Chrome, but also, e.g., Microsoft Edge and Firefox.
* At least a good text editor such as Sublime Text 3. A code editor such as VS Code or IDE such as NetBeans can be used.
* Online git repositories must be used for collaboration.

# Additional material

A fast and reliable USB storage device is recommended for the installation of a portable Web server and RDBMS when the use of multiple computers is needed. Use cloud storage to ensure that your work is never lost or unavailable.

# Grading Scheme

**Description** **Grade Value** **Completion Date** (tentative)

Assignment 1 15% Week 3, in-class demo

Assignment 2 15% Week 6, in-class demo

Midterm 20% **Week 7**, in class

Term project: 30%

Deliverable 1: project proposal 2% Week 2

Deliverable 2: Feature suite and ERD 3% Week 5

Deliverable 3a: 50% progress checkpoint 10% Week 9

Deliverable 3b: Completed Implementation 10% Week 14

Deliverable 4: Presentation and demo 2% Week 14

Deliverable 5: User guide 3% Week 15

Final exam 20% Week 15

## Notes:

1. Assignments are demonstrated in-class as part of the marking process to provide feedback before the exam.
2. Assignments will be executed in teams of 2 or 3 students.
3. In order to pass the course, students must achieve an average of at least 60% on Exam 1, Exam 2, and the Term project. This translates to a score of at least 42 out of 70. If less than 60% is achieved for these assessments, the final score will be at most that failing average regardless other scores.
4. Late work (any work counting toward grades) is not accepted unless prior arrangement with the teacher. In this case, the penalty for submitting late work is 20% per day (all 7 days of the week count toward this penalty).
5. Students will be notified of minor assessments ideally one week prior, but minimally the class before.

# Term Project (Learning Integration Assessment)

In groups of 2, students develop, implement, and deploy a transactional Web application integrating the following aspects:

* User registration, authentication, and authorization, including two-factor authentication.
* Prevention of common security risks such as SQL injection and cross-site scripting (XSS).
* Internationalization and localization.
* Transactions with a database dedicated to this Web application.
* Reading data from an external Web service.
* Developed using a Behaviour-Driven Development methodology, complete with a test suite automated with an appropriate framework, such as Behat.

The Web application scope should be representative of a typical small Web application found online that can be programmed by a team of 2 people. In this project, each student implements 10 user requirements, expressed as complete user stories written by the students themselves.

Deliverables:

* Deliverable 1: Project proposal
* Deliverable 2: Feature suite: Feature behaviours written using a language such as gherkin for consumption in automated testing frameworks and database ERD
* Deliverable 3a: 50% progress checkpoint
* Deliverable 3b: Completed implementation
* Deliverable 4: In-class presentation and demonstration
* Deliverable 5: Final report including updated features and a user guide

## LIA Evaluation Criteria

The following criteria are considered in the evaluation of the project deliverables:

* Throughout: Appropriate use of version control.
* Proposal
  + Relevance of the proposal to the context of the Web
  + Feasibility of the proposal to the context of the Web
* Feature suite and ERD
  + Compatibility of the feature with the acceptance tests
  + Completeness of the acceptance test coverage for the described features
  + Feature support by the database described by the ERD
* In the implementation (50% progress checkpoint and completed implementation):
  + Respect of the selected design pattern.
  + Correct selection and implementation of algorithms.
  + Correct validation of data inputs.
  + Appropriate corrective measures to ensure platform security.
  + Reasonable consideration of User Experience.
  + Appropriate design of User Interface.
  + Appropriate automated test suite.
  + Absence of execution and logical errors
* In the documentation:
  + Correct presentation of work completed.
  + Correct demonstration of product usability.
* In the presentation, clear communication of
  + project objectives, need addressed, and target user-base.
  + difficulties met in the project and solutions.
  + lessons learned.

# SPLI

The quality of English expression will be evaluated and be worth 10% of the total as part of grading the LIA written reports and in-class presentations.

# Teaching Methodology

Programming exercises and discussion on sample programs can take place either during the lecture time or lab period. All meetings will be held online at the time of the scheduled classes on the MS Teams Team for this course.

## Lectures, 2 hours per week

Important material from the text and outside sources will be covered in class. Students should plan to take careful notes as not all material can be found in the texts or readings. The 2 hours will be spread out according to the lecturing needs.

## Lab periods, 3 hours per week

Lab time will be to allow the students to explore the course material firsthand. During these labs, the students will explore the material through exercises, examples and the execution of their assignments. Lab periods allow students to get support from the teacher while practicing hands-on skills. In the lab, students can visit certain Web sites to work out program examples and tutorials emphasizing specific programming concepts for Web applications.

## Assignments, 3 hours per week

These activities will be assigned to reinforce material learned in class.

# Course Policies

## Remote desktop access, classroom management, and Webcams

In the event of distance teaching, you will install remote desktop access and classroom management tools on your computer to make teaching, helping, and invigilating possible. Webcams would be turned on during exams and presentations done in the distance teaching context.

**Classroom and Lab rules of conduct**

An important objective of the Computer Science Technology program is to develop the ability to work in a business environment. As a result, particular attention will be paid to students’ attitudes and students are expected to conduct themselves in a professional manner while in class.

* **Avoid being distracted by non-course related online content and focus on the tasks on hand in order to comprehend the material and meet deadlines and to get the most value out of the course.**
* Be respectful to your instructor and fellow classmates at all times.
* Be punctual, be present at the specified class start time and avoid interruptions and if you have an exception join or leave the session discreetly.
* For Online Presence:
  + Mute your microphone at all times except when you need to talk.
  + Prepare the online environment in advance to make sure the audio/video equipment is working, the internet connection is reliable and all necessary software is installed
  + Try to set yourself up in a quiet place.
  + Use the chat efficiently to ask questions or communicate with colleagues when permitted. It is not allowed to spam, post jokes or content without the permission of the teacher.
* For Physical Presence:
  + Cell phones and pagers must be turned off during classes and labs as a courtesy, do not talk, use a computer, or print while the instructor is talking to the class or when a student is asking a question which pertains to the class.
  + Do not raise your voice when talking to each other and while other fellow classmates are working.
  + Do not bring food and drink into the classroom or the labs.
* You are encouraged to work with other students to solve problems. However, you must complete your own assignments.

## Attendance requirement

Students are responsible for material discussed during class time even when they are absent. The material covered in class may be different from what is presented in referenced material. Written and spoken class material may be part of exams. There is no grade for attendance, but students are responsible for in-class work and assessments whether they are present or absent.

## Using Omnivox

Throughout the semester, students will use Omnivox to download material, upload deliverable files, and obtain all course information.

## Practice Lab

Students can use laboratories in the D-200 sector of Vanier College as needed and available for assignments, tutorials, and homework.

# 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 and potential modifications due to the COVID-19 situation. 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/](http://www.vaniercollege.qc.ca/psi/course-level-policies/" \t "_blank).

Complete policies can be found on the Vanier College website, under [Policies](http://www.vaniercollege.qc.ca/bylaws-policies-procedures/category/policies/" \t "_blank).

Your attention is drawn in particular to the following policies: policies on academic complaints; cheating and plagiarism; religious holy day absences; student misconduct in the classroom; and, student rights and responsibilities that are stated in IPESA Policy (Section 5.1).

**Recourse and complaints**  
If you have a problem that you have been unable to resolve by talking with your teacher, you may wish to enlist the help of the Faculty Mediation Committee. The committee member names and contact information are available through your Program and Department coordinator(s). Detailed information is found in section 6.2 of the IPESA. Contact information can be found below.

# Main Contact Information

* Student Advocate: Chelsea McVetty (MIO)
* Program and Department Coordinators: Perry James (jamesp) & Tassia Araujo (araujot)
* Mediation Committee chair: Djohara Benyamina (benyamd)
* Faculty Dean: Haritos Kavallos (kavalloh)
* Academic Advisors: <https://www.vaniercollege.qc.ca/advising/contact-us/>

# Weekly breakdown of course activities (tentative)

| Week | Theory (2h) | Lab(3h) | Homework(3h) |
| --- | --- | --- | --- |
| 1 | - Course outline discussion  - What eCommerce is (Business models of the FANG companies)  - MySQL Databases | - Installing the environment.  - Build a database with 2 tables and SQL associated  - Using GitHub for version control, issue-tracking, and code dev documentation. | Assignment 0 (individual): At home, complete a revision of Internet Programming and "the AJAX assignment" |
| 2 | Intro to the PHP language  - Overview of the syntax and different control structures  - writing and using classes  - arrays: sequential and associative | Guided implementation of base classes as a framework to PHP MVC applications up to databases.   * Include and require | Assignment 1 (in pairs): A PHP MVC application accessing a database and modifying 2 or more tables with a master-detail relationship  **Deliverable 1: Project proposal** |
| 3 | - Legal requirements about information collected/kept.  - Confidentiality and what to store in a DB and what to avoid.  - HaveIBeenPwned, confidentiality, and known data breaches  - Unit testing for PHP | Work on assignment 1 for section 1 only | Week dedicated to assignment 1 |
| 4 | PHP MVC applications using PDO to handle databases with 2+ tables having a master-detail relationship  - File uploads  - Data validation | In-Class time to work on Assignment 1 including  - Record searches from user input  - populating dropdown lists to select master-record information in a form | Week dedicated to assignment 1  Feedback provided to the students the course preceding the exam. |
| 5 |  | New topics:  - authentication (registration, login, proper hashing) | Assignment 2: Data management system complete with user registration and authentication, e.g., a complete social network application  **Deliverable 2: Feature suite and ERD** |
| 6 | Cookies and session variables.  User registration, and authentication (login). | Lab:  user authorization and redirections | Week dedicated to assignment 2 Feedback provided to the students the course preceding the exam. |
| 7 | Midterm exam | Midterm exam solution | Week dedicated to assignment 2 Feedback provided to the students the course preceding the exam. |
| 8 | - 2-factor authentication setup in user accounts and app-based authenticator with QR code | Lab: implementation of 2FA | Week dedicated to assignment 2 Feedback provided to the students the course preceding the exam. |
| 9 | - ECommerce transactions  Connection to databases  - prepared statements and SQL injection |  | End assignment 2  Feedback provided to the students the course preceding the exam.  **Deliverable 3a: 50% progress checkpoint** |
| 10 | How to implement features in the framework  - user registration  - user login  - session variables, cookies  - 2-factor authentication  - authorization of users | Lab to implement authentication and 2FA  Time functions and timestamps | Start Project: multilingual PHP MVC application with 2FA, transactions and external web services, such as a social network integrating external data (stocks, weather, etc) |
| 11 | Avoiding XSS(<https://paragonie.com/blog/2015/06/preventing-xss-vulnerabilities-in-php-everything-you-need-know>) |  | Project |
| 12 | Using external data exchange services. | Lab: configuring and accessing a major API | Project |
| 13 | Proper application of internationalization techniques  - setting and getting locale  - date, time, and number formats  - text translations | Lab: implementation of i18n | Project |
| 14 | Web migration, server setup, and direct-to-server git repos (as time allows) | SEO | **Deliverable 3b: Completed implementation**  **Deliverable 4: in-class presentation and demonstration** |
| 15 | Project presentations | Project presentations | **Deliverable 5: User guide** |
| 16 | No class | Project presentations section 2 only |  |