

## Course description

<b>General information</b>		
Course leader	<b>Nicolas LAURIO</b>	
Course title	<b>Progressive Web App</b>	
Study programme	<b>Title of Expert in Information Technology</b>	
Course status	<b>Graduate Program</b>	
Year	2	
Number of credits and mode of teaching delivery	ECTS student workload coefficient	4
	Number of hours (L+E+S)	(16+0+76) 91

### 1. COURSE DESCRIPTION

#### *1.1. Course objectives*

The module “Progressive Web App” focuses on the experiences which combines the best of web and the best of application. They are necessary for the users, directly accessible via a browser tab.

#### *1.2. Conditions for enrolment in the course*

- Have basic knowledge of HTML, CSS and Javascript.
- Have a good understanding of the web concepts.
- Have a good knowledge of a Javascript framework (Angular, Vue, React...).
- Have a good knowledge of command line interface.

#### *1.3. Expected learning outcomes of the course*

LO1: Create a progressive web app.

LO2: Design an app manifest to make the web app installable on the device home screens.

LO3: Implement a solution by using service workers to offer offline support by caching assets and data sources.

LO4: Create a solution by using advanced service worker and catching strategies.

LO5: Design and implement push notifications.

LO6: Implement data synchronization.

LO7: Access native device features (camera, geolocation, etc.).

LO8: Secure your progressive web app.

LO9: Test your progressive web app across different browsers and different OS.

#### *1.4. Course content*

The lectures are structured on two days.

**Lecture 1:**

- Introduction
- What are Progressive Web Apps?
- Why using Progressive Web Apps?
- The service Worker and the Web Manifest
- The first progressive web app using Html and JS
- Audit your app with Lighthouse
- Create Web Hosting With Free SSL Certificate
- First look at PWA frameworks
- About compilation cycle to create a PWA using a framework
- Fit all screen and form factors using a responsive design.
- PWA creation using a framework
- Introduction to SSR and benefits

**Lecture 2:**

- Basic service worker implementation without framework.
- Basic service worker implementation with framework.
- Update a PWA.
- Webpush introduction.
- Basic Webpush implementation without framework.
- Create an online hosted PWA (using a framework) with :
  - A service worker sample of use.
  - Handling PWA Update on client side.
  - Communication with a nodeJS backend to store webpush token and to automate webpush sending according to user action on the PWA.
- Q&A time.

The final project consists of an oral defence.

The objective of the project is to imagine an useful PWA, which is a true asset in programming efficiently a website and a mobile application.

The students must use their technical skills to have a real world application with a perfect user experience. Design will also be taken into account as well as the ability to imagine and to implement a number of efficient use cases.

The following technical skills will be used for the project:

- A custom manifest
- A service worker
  - Real world implementation of webpush notifications
  - Handle applications update
  - Caching assets
  - Caching datasources
- Secure communication with a custom backend.
- Fit all screen and form factors using a responsive design.
- Custom backend exposing an API and using a database.
- Handle permissions to access the browser features (localization, bluetooth, etc)
- Provide an app-like experience which leverages the re-engagement tools.
- Give access to the repository (frontend and backend code) and to the hosting PWA.
- Android installable.
- iOS installable.
- Ability to give a presentation and to explain the choices done for the project.

<p><i>1.5. Teaching delivery modes:</i></p>	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and <input type="checkbox"/> workshops <input type="checkbox"/> exercises <input type="checkbox"/> remote learning <input type="checkbox"/> field work	<input checked="" type="checkbox"/> independent work <input type="checkbox"/> multimedia and network <input type="checkbox"/> laboratory <input checked="" type="checkbox"/> mentoring <input type="checkbox"/> other _____ -
<p><i>1.6. Comments</i></p>	<p>The module is composed of interactive class and case studies.</p>	
<p><i>1.7. Student obligations</i></p>		
<p><b>STUDENT ATTENDANCE</b>          Class attendance is mandatory in the percentage prescribed by the Studies and examination regulations.</p> <p><b>PASSING EXAM</b></p>		

Each group of students must submit their results to the teachers and give an oral presentation based on their results. The results are reviewed by the academic staff during an oral examination. A justification of the project work can be explained by the students.

*1.8. Monitoring<sup>1</sup> student work*

Class attendance		Activity during class		Seminar paper		Experimental work	
Written exam		Oral exam		Essay		Research	
Project	100 %	Continuous assessment of knowledge		Student report		Practical work	
Portfolio							

*1.9. Assessment and evaluation of student work during classes and the final exam*

The students are assessed on the project results.

**CONCRETE REVIEW OF EVALUATION METHODS**

The maximum number of points that a student can earn in a course is 100. Grades are calculated according to the following criteria table within which the distribution of passing grades in terms of the number of points is applied.

Points	Grade
0,00 - 50,00	(E) unsatisfactory
50,01 - 58,00	(D) sufficient
58,01 - 75,00	(C) good
75,01 - 92,00	(B) very good
92,01 - 100,00	(A) excellent

The method of accumulating points is determined in this course in accordance with the elements of scoring as follows:

Criterion	Maximum points
Project	100
<b>TOTAL</b>	<b>100</b>

*1.10. Required reading (at the moment of submitting the joint study programme report)*

*1.11. Additional reading (at the moment of submitting the joint study programme report)*

Adam Bar. 'What web can do', 2020. <https://whatwebcando.today/>

<sup>1</sup> IMPORTANT NOTES: Next to each method of monitoring student work it is necessary to insert an adequate share of each activity in ECTS credits, so the total number of ECTS credits corresponds to the credit value of the course. You can use empty fields for additional activities.

Web Dev Team. 'Web.Dev', 2020. <https://web.dev/progressive-web-apps/>

MIT, ERCIM, Keio, Beihang. 'W3C', 2020. <https://www.w3.org/>

Chrome Dev Summit 2020. 'Web', 2020. <https://developers.google.com/web/showcase>

Paul Van Eck. 'Create a progressive web application for offline image classification', *IBM Developer*, October 9, 2019. <https://developer.ibm.com/technologies/artificial-intelligence/patterns/create-a-progressive-web-application-for-offline-image-classification/>

Paul Van Eck. 'Create a progressive web application for offline image classification', 2019. <https://github.com/IBM/tfjs-web-app>

Matthew Gaunt. 'Guitar Tuner', 2014. <https://github.com/googlearchive/guitar-tuner>

Luke Vu. '11 Best Progressive Web Apps (PWAs) Games in 2020', February 10, 2019. <https://www.simicart.com/blog/pwa-games/>

Jeremy Ckahn. 'Awesome PWA', 2020. <https://github.com/hemanth/awesome-pwa>

*1.12. Number of copies of required reading in relation to the number of students who currently attend a course*

<i>Title</i>	<i>Number of copies</i>	<i>Number of students</i>

*1.13. Methods of quality monitoring that ensure the acquisition of knowledge, skills and competencies.*

The content of each modules is continuously revised to teach the students on the most up-to-date notions and concepts of IT. Indeed, the range of skills and knowledge in this sector is constantly getting broader, with a larger perspective of working in many different fields.

To ensure the quality of the teaching, a Steering Committee supervises the Quality Management System. The evolution of the teaching content is revised and validated by the Development Council. The teachers as well as the administration staff are evaluated by the students themselves. Finally, the teaching content is analysed and determined by evaluating the skills during the internships, by the partner companies.