EPITECH.

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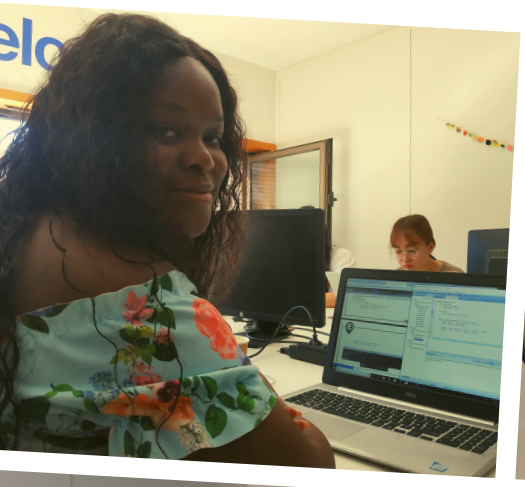
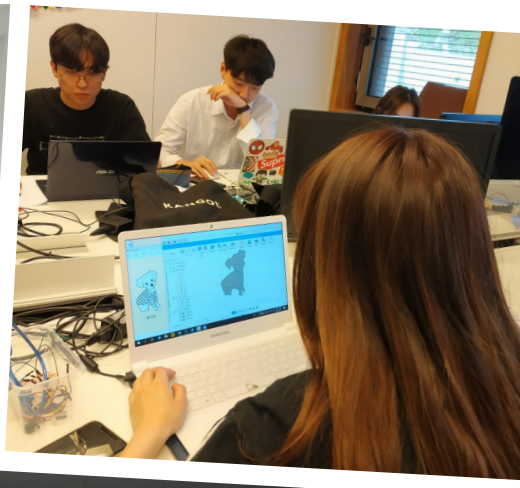
EPITECH - SCHOOL OF IT & INNOVATION

Courses offered in English (2019-2020)

SPRING SEMESTER



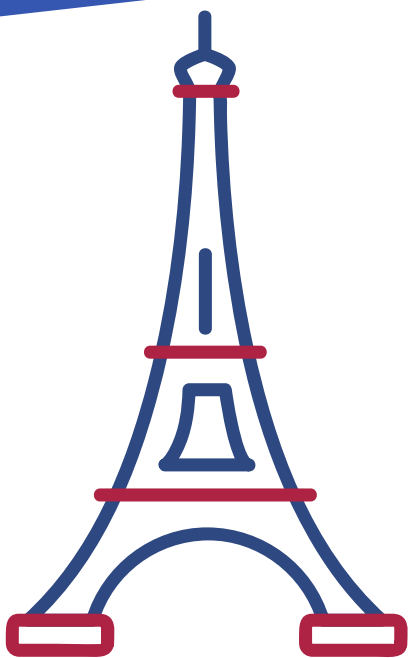


EPITECH

School of IT and Innovation in France

- Epitech as the largest French IT school
- Based on 13 campuses in France
- Also based on 3 european campuses (Spain, Germany and Belgium)

- Full project-based learning method implemented
- Bachelor and master level courses fully in English



Contact us on international-relations@epitech.eu

International Bachelor Program

Second-year courses

Program aim:

Learning outcomes:

Prerequisites:

Code	Course	Credit (ECTS)
B-CNA-410	Computer Numerical Analysis - Trading	2
B-CCP-400	Concurrent Programming	2
B-FUN-400	– Functional Programming	4
B-MAT-400	Mathematics	3
B-NSA-400	Network and System Administration	2
B-NWP-400	Network Programming	4
B-OOP-400	Object-Oriented Programming	4
B-SHL-400	Shell Scripting	1
B-PSU-402	Unix Programming - Instrumentation	3
B-PSU-400	Unix Programming - Memory	3
B-ASM-400	x86-64 Assembly	2
B-YEP-400	Year-End-Project – Indie Studio	4
B-YEP-410	Year-End-Project - Zappy	4
B-INN-000	Guided Project – Innovation Hub	8

[B-CNA-410] Computer Numerical Analysis - Trading

Computer Numerical Analysis- Trading introduces to the use of programming and mathematical tools in the field of trading.

Skills to be acquired

- Research professional tools and how to implement them.
- Develop a custom algorithm
- Interface with an existing platform
- Algorithm optimization and live editing

Teaching methods

The students work on two projects for a total duration of 18 weeks of work. Each project is evaluated individually with automated tests giving the student and the academic team the information about the completion of each project.

Credit value

2 ECTS

Assessments

Online project submission

Project Example

Name: Trade
Subject: Elaborate your own algorithm in a simulated trading environment

[B-CCP-400] Concurrent Programming

Concurrent Programming teaches the concept of concurrent accesses in programming.

Skills to be acquired

- Threads and mutexes
- IPC (semaphores, message queues, etc.)

Teaching methods

The students work on one project for a total duration of 4 weeks of work. Each project is evaluated individually with automated tests giving the student and the academic team the information about the completion of each project. The project is to be worked in groups of 2 to 4 students.

Credit value

2 ECTS

Assessments

Online project submission

Project Example

Name: The Plazza
Subject: Create a program that handle a pizzeria capable of scaling by opening multiple kitchen and multiple cooks per kitchen.

[B-FUN-400] Functional Programming

Functional Programming focuses on introducing the functional paradigm of programming.

Skills to be acquired

- Recursive functions
- Lists
- Pattern matching and pattern guards
- Partial application
- Modules
- Project management with Stack
- Input/Output
- Monads

Teaching methods

The students work on two projects for a total duration of 7 weeks of work. Each project is evaluated individually with automated tests giving the student and the academic team the information about the completion of each project.
The second project is to be worked in pairs.

Credit value

4 ECTS

Assessments

Online project submission

Project Example

Name:
Subject:
Aim:

- [B-MAT-400] B4 – Mathematics

Mathematics focuses on Probability and Statistics.
This unit is the continuation of the previous modules Mathematics. The students must take the required modules to attend the course. The students learn to create algorithms by using mathematical methods and to use graphic tools (plotting different kinds of curves).

Skills to be acquired

- Probability
- Statistics

Teaching methods

The students work on nine mini-projects of 2 weeks each for a total duration of 18 weeks of work on this unit. Each project is evaluated individually with automated tests giving the student and the academic team the information about the completion of each project.

The students work on each project alone or by two.

Credit value

3 ECTS

Assessment

Online project submission.

Project example

Name: 202unsold
Subject: Compute the features of random variables defined by their mutual probability law.

[B-NSA-400] Network and System Administration

Network and System Administration teaches the students to master the Unix exploitation system. The module level is more advanced.

Skills to be acquired

- Install and configure an exploitation system on the command line
- Manage users and their rights and permission
- Configure a graphic environment

Teaching methods

The students work on one project for a total duration of 4 weeks of work. Each project is evaluated individually with automated tests giving the student and the academic team the information about the completion of each project.

Credit value

2 ECTS

Assessment

Online project submission

Project example

Name: S.N.A. Project
Subject: Install a small network of servers services such as dhcp, dns,web server and mail.
Aim: Know how to make a dual boot installation and basic network configurations

[B-NWP-400] Network Programming

Network programming is specifically designed to introduce the following concepts:

- Network communication
- Data packets

Skills to be acquired

- Multi-client programming
- Communication protocol implementing
- Documentation reading and understanding

Teaching methods

The students work on three projects for a total duration of 8 weeks of work. Each project is evaluated individually with automated tests giving the student and the academic team information about the completion of each project. The first two projects are solo project. The third project is in pairs.

Credit value

4 ECTS

Assessments

Online project submission

Project Example

Name: FTPServer
Subject: Create a server respecting the FTP protocol
Aim: Know how to read an RFC and introduction to TCP sockets.

[B-OOP-400] Object-Oriented Programming

Object-Oriented Programming introduces to the Object-Oriented Programming paradigm.
It focuses on modularization and problematic' abstraction by using practical examples such as dynamic libraries.

Skills to be acquired

- Paradigm shift
- Modularization
- Abstraction and generic programming

Teaching methods

The students work on two projects for a total duration of 10 weeks of work. Each project is evaluated individually with automated tests giving the student and the academic team information about the completion of each project.
The first project is a group project for up to 2 students.
The second project is a group project of 2 to 3 students.

Credit value

4 ECTS

Assessments

Online project submission

Project Example

Name: Arcade
Subject: Create an arcade system with a core capable of handling multiple game and multiple display library (terminal, 2D graphics, 3D graphics, …)
Aim: Architecture a project around modules that can be interchanged.

[B-SHL-400] Shell Scripting

Shell Script introduces the notions and teaches how to use it, with a certain degree of complexity.

The module consists of a project work.

Skills to be acquired

- Fast adaptation and autonomy in shell scripting

Teaching methods

The students work on one project for a total duration of 1 week of work. Each project is evaluated individually with automated tests giving the student and the academic team the information about the completion of each project.

Credit value

1 ECTS

Assessments

Online project submission

Project Example

Name: bdsh
Subject: Create a small database using shell script
Aim: Learning the basics of scripting the shell

[B-PSU-402] Unix Programming - Instrumentation

Unix Programming - Instrumentation teaches the students to have a better understanding of ELF files and reverse engineering. It allows the students to understand how debuggers and disassemblers function in UNIX.

Skills to be acquired

- Discern the userland's kernel space;
- Know which information can be retrieved in a process
- Explore the system call concept in greater depth
- Learn how to plot a program's execution
- Become an expert in Unix system programming
- Learn how to decode x86-64 binary instructions

Teaching methods

The students work on two projects for a total duration of 6 weeks of work. Each project is evaluated individually with automated tests giving the student and the academic team the information about the completion of each project.
The second project is in pairs.

Credit value

3 ECTS

Assessments

Online project submission

Project Example

Name: strace
Subject: Re-code the strace program
Aim: master the basics of debugging in linux (ptrace)

[B-PSU-400] Unix Programming - Memory

Unix Programming- Memory introduces about memory allocation management in an UNIX environment.

Skills to be acquired

- Understand the mechanisms of memory management (in particular the links between physical memory and virtual memory);
- Understand the structure of a binary (ELF) file format

Teaching methods

The students work on two projects for a total duration of 5 weeks of work. Each project is evaluated individually with automated tests giving the student and the academic team the information about the completion of each project.

Credit value

3 ECTS

Assessments

Online project submission

Project Example

Name: malloc

Subject: Create your own version of the function malloc and free
Aim: Learn about memory management using brk()

[B-ASM-400] x86-64 Assembly

x86-64 Assembly introduces the x86-64 assembly and the use of this low-level language for the development of a minimalistic C library.

Skills to be acquired

- Know about x86-64 processor and its instruction set
- Know about memory and stack operation
- Know about address spaces and function calling

Teaching methods

The students work on one project for a total duration of 4 weeks of work. Each project is evaluated individually with automated tests giving the student and the academic team the information about the completion of each project.
The project is to be worked in pairs.

Credit value

2 ECTS

Assessments

Online project submission

Project Example

Name: minilibc
Subject: Create your own miniature version of the LibC

[B-YEP-400] Year-End-Project – Indie Studio

Year-End-Project – Indie Studio corresponds to one of the two final projects of the semester. The first project is linked to the understanding of an OOP architectures.

Skills to be acquired

- Go from procedural paradigm to object paradigm
- Modularize a problematic
- Abstract such problematic

Teaching methods

The students work on one big project for a total duration of 6 weeks of work. Each project is evaluated individually with automated tests giving the student and the academic team information about the completion of each project. The project is to be done in groups of 4 to 6 students.

Credit value

4 ECTS

Assessments

Online project submission

Project Example

Name: Indie Studio
Subject: As an independent game studio would, re-create a classic Bomberman game.

[B-YEP-410] Year-End-Project - Zappy

Year-End-Project – Zappy is one of the two final projects of the semester. It summarizes several concepts such as network programming (using TCP sockets), Artificial Intelligence and GUI.

Skills to be acquired

- Network programming
- GUI
- Basic artificial intelligence

Teaching methods

The students work on one project for a total duration of 6 weeks of work. Each project is evaluated individually with automated tests giving the student and the academic team the information about the completion of each project. The project is to be done in groups of 4 to 6 students.

Credit value

4 ECTS

Assessments

Online project submission

Project Example

Name: Zappy
Subject: Simulate a world (the TCP server) and it's habitant in a quest to survive and evolve.

[B-INN-000] Guided Project – Innovation Hub

Guided Project teaches the students to practice all their knowledge and skills acquired, in a business environment.

They will be advised and supervised by the Innovation Center of Epitech.

Skills to be acquired

- Project Management
- Ideation and brainstorming
- Prototyping
- Documentation
- Communication and persuasion skills

Teaching methods

Guided project with monthly follows-up supervised by the Epitech Innovation Center Team.

Credit value

8 ECTS

Assessments

Project submission