



Exploitation plan for
problem-based learning laboratory oratory
John von Neumann Institute - VNUHCM

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Content

1. Name of the laboratory	3
2. Faculty in which the laboratory belongs.....	4
3. Purpose of the laboratory.....	6
3.1 Guidelines for use	6
3.2 Activities and courses	6
4. Resources	16
4.1 Equipment	16
4.2 Staffing.....	17
4.3 Financial support	18

586297-EPP-1-2017-1-EL-EPPKA2-CBHE-JP

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1. Name of the laboratory

The laboratory oratory is funded by the ALIEN project and is established at the John von Neumann Institute (JVN). JVN is an institute that directly belongs to Viet Nam National University of Ho Chi Minh City (VNUHCM). It is located at the JVN building in IT Park of VNUHCM, Quarter 6, Linh Trung Ward, Thu Duc District, Ho Chi Minh City, Viet Nam. The laboratory oratory is named “Active Learning Laboratory oratory”. It is identified through the logo of the ALIEN project and is co-located with the laboratory of data science. The server of laboratory oratory is installed in the server room of JVN.

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2. Faculty in which the laboratory belongs

JVN has 2 scientific programs, namely Information and Communications Technology and Quantitative Computational Finance. Each scientific program has a graduate program and a laboratory oratory where JVN's lecturers, students, and researchers can work together in courses or projects. Through this model, JVN's students have a great opportunity to join in more practical projects with their lecturers or researchers, not only from JVN but also from industrial partnerships of JVN with companies.

This laboratory is used by both the scientific programs. Therefore, this laboratory can be the destination of all courses of graduate programs and all projects of JVN. For that reason, from the design phase, JVN introduced the solution of supporting physical and virtual working environments. The students can access the ALIEN active learning platform for their courses through laptops in the laboratory oratory or through an Internet connection from their own location. This solution has demonstrated advantages, especially in the COVID-19 pandemic.

The figure below shows how the laboratory oratory fits in JVN's organogram of departments and programs:

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ALIEN LABORATORY ORATORY EXPLOITATION PLAN

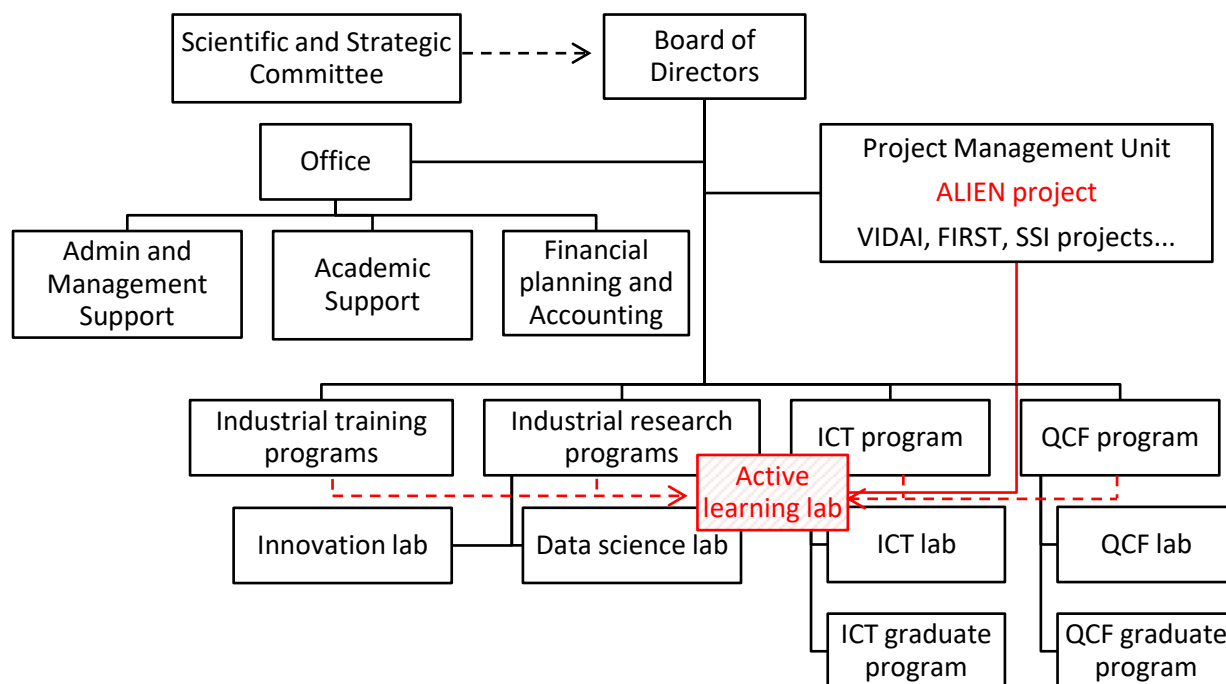


Figure 1. The Active Learning Laboratory in JVN's organogram.

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3. Purpose of the laboratory

The laboratory oratory will be used by students under JVN's lecturers' instruction in the courses of JVN's ICT and QCF graduate programs. With the laboratory oratory's resources, lecturers and students may work together in their courses more interactively and innovatively using the virtual machine enabled server, wireless connection hub, and a large monitor available on site. In the case of remote working, JVN provides a VPN connection through an Internet broadband network and a VMWare installed server.

3.1 Guidelines for use

The guidelines for using the laboratory are:

- Lecturers will register their courses in the laboratory each semester. They will prepare the activities that will take place in the laboratory using laboratory resources such as laptops, servers, connections, and software.
- Students will register for using the laboratory in a registration plan managed by a researcher.
- The registration plan will be approved by the lecturers and the project manager and will be communicated to the researcher for his cooperation.
- After each semester a report how to use the laboratory more effectively and improve active learning for students will be prepared.

3.2 Activities and courses

Following is a list of courses in which the laboratory is currently used:

1. Enterprise Architecture: The course is part of the ICT graduate program at John von Neumann Institute. The course is also offered in the ICT graduate program in Polytechnic University of Ho Chi Minh City. 12 students enrolled in semester 1 of academic year 2019 -

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ALIEN LABORATORY ORATORY EXPLOITATION PLAN

2020 and 15 students enrolled in semester 1 of the academic year 2020 - 2021. The lecturer of the course is Dr. Huy Nguyen (JVN). Students implemented the following steps and activities:

- Students studied, presented, and discussed the general definition of enterprise architecture.
 - Students selected a business scenario to build an enterprise architecture work.
 - Students looked for different business reference models to use in their scenario.
 - Students reviewed lessons with interactive games using Kahoot®. Students created the games themselves under teacher guidance. After each game, the lecturer posed questions on the wrong or unclear answers, encouraging students to discover more on the missed points.
 - Students played scenario games in which they provided input related to the practical application of knowledge and techniques in developing enterprise architectures.
 - Students used EA Sparx® and Dropbox® to build and share their results with their classmates and lecturer.
 - Students worked in groups to develop models and presented their results to their peers and the instructor.
 - Students summarized their results in a shared document that they collectively edited.
 - Students raised concerns or interests during the course and engaged in discussions with their classmates in the final session. The lecturer helped students align their points with the framework of the course for developing more effective understanding of concepts and enabling student to apply new knowledge in practice.
2. Decision Analysis: The course is part of the Quantitative Computational Finance graduate program at John von Neumann Institute. This course is also offered in some Applied Mathematics graduate programs in University of Economics and Law - VNUHCM and University of Natural Sciences - VNUHCM. 22 students enrolled in semester 2 of academic

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ALIEN LABORATORY ORATORY EXPLOITATION PLAN

year 2018 - 2019 and 17 students enrolled in semester 2 of academic year 2019 - 2020. The lecturer of the course is Dr. Brett Houlding (TCD) and Dr. Man Ngo (JVN). Trinity College Dublin (TCD) is the partner of JVN in the VIDAI project funded by Irish Aid.

Students implemented the following steps and activities:

- Students studied analysis techniques and finished the exercises in different contexts given by the lecturer.
- Students selected a topic in a pre-defined list and prepared a data story through which they illustrated the related concepts to the lecturer and their classmates.
- Students researched different data analysis models and data sources applicable in their scenario.
- Students reviewed lessons with interactive games using Kahoot®. Students created the games themselves under teacher guidance. After each game, the lecturer posed questions on the wrong or unclear answers, encouraging students to discover more on the missed points.
- Students played scenario games in which they provided input related to the practical application of knowledge and techniques in decision making.
- Students used R, Python, and Google® Class to build and share their results with their classmates and lecturer.
- Students worked in groups on the analysis of the scenario that they selected and prepared a presentation summarizing their findings for the benefit of their classmates.
- Students summarized their results in a shared document that they collectively edited.
- Students assumed roles of professionals in a data science department. They discussed plans for applying their knowledge and skills in the context set by the lecturer.
- Students raised concerns or interests during the course and engaged in discussions with their classmates in the final session. The lecturer helped students align their points with

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ALIEN LABORATORY ORATORY EXPLOITATION PLAN

the framework of the course for developing more effective understanding of concepts and enabling student to apply new knowledge in practice.

3. Time Series Analytics and Forecasting: The course is part of the Quantitative Computational Finance graduate program at John von Neumann Institute. The course is also offered in some Applied Mathematics graduate programs in University of Economics and Law - VNUHCM and University of Natural Sciences - VNUHCM. 21 students enrolled in semester 2 of the academic year 2018 - 2019 and 16 students enrolled in semester 2 of academic year 2019 - 2020. The lecturer of the course is Dr. Jason Wyse (TCD) and Dr. An Mai (JVN). Trinity College Dublin (TCD) is the partner of JVN in the VIDAI project funded by Irish Aid.

Students implemented the following steps and activities:

- Students studied analysis techniques and executed exercises in different contexts provided by the lecturer.
- Students selected a topic and data package from a pre-defined list and applied different data analysis techniques for understanding the story in focus. They presented the story to the lecturer and their classmates. The story was used to predict the future of the scenario using evidence from their analysis results.
- Students reviewed lessons with interactive games using Kahoot®. Students created the games themselves under teacher guidance. After each game, the lecturer posed questions on the wrong or unclear answers, encouraging students to discover more on the missed points.
- Students played scenario games in which they provided input related to the practical application of knowledge and techniques in their scenario of choice.
- Students used R and Python to build and share their results with their classmates and lecturer.
- Students worked in groups on the analysis of the scenario that they selected and prepared a presentation summarizing their findings for the benefit of their classmates.

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ALIEN LABORATORY ORATORY EXPLOITATION PLAN

- Students summarized their results in a shared document that they collectively edited.
 - Students packaged their solutions as an application and demonstrated in a presentation to their lecturer and classmates how to use the application in similar contexts.
 - Students raised concerns or interests during the course and engaged in discussions with their classmates in the final session. The lecturer helped students align their points with the framework of the course for developing more effective understanding of concepts and enabling student to apply new knowledge in practice.
4. IT Management: The course is part of the ICT graduate program at John von Neumann Institute. 17 students enrolled in semester 2 of academic year 2018 - 2019 and 21 students enrolled in semester 2 of academic year 2019 - 2020. The lecturer of the course is Dr. Huy Nguyen (JVN).

Students implemented the following steps and activities:

- Students studied, presented, and discussed the general definition of and roles in IT management.
- Students selected a business scenario on which they would build an IT plan.
- Students looked for different potential IT solutions to apply in their scenario.
- Students reviewed lessons with interactive games using Kahoot. These games are Students reviewed lessons with interactive games using Kahoot®. Students created the games themselves under teacher guidance. After each game, the lecturer posed questions on the wrong or unclear answers, encouraging students to discover more on the missed points.
- Students played scenario games in which they provided input related to the practical application of knowledge and techniques in developing and operating an IT solution effectively.
- Students used Office® software, modeling tools, and Dropbox® to build and share their results with their classmates and the lecturer.

586297-EPP-1-2017-1-EL-EPPKA2-CBHE-JP

ALIEN LABORATORY ORATORY EXPLOITATION PLAN

- Students worked in groups on aspects related to the development, exploitation, and maintenance of an IT solution for a specific scenario and presented their findings to the teacher and their classmates.
- Students summarized their results in a commonly owned shared document.
- Students raised concerns or interests during the course and engaged in discussions with their classmates in the final session. The lecturer helped students align their points with the framework of the course for developing more effective understanding of concepts and enabling student to apply new knowledge in practice.

5. Management Information Systems: The course is part of the ICT graduate program at John von Neumann Institute. However, this course is also offered appropriately in the ICT undergraduate program in Ho Chi Minh University of Technology and the ICT graduate program in University of Economics and Finance. 23 students enrolled in semester 1 of academic year 2019 - 2020 and 27 students enrolled in semester 1 of academic year 2020 - 2021. The lecturers of the course are Dr. Huy Nguyen (JVN) or Dr. Minh Nguyen (IU-VNUHCM).

Students implemented the following steps and activities:

- Students studied, presented, and discussed the general definition of management roles and management information systems.
- Students selected a business scenario on which they would build an IT solution.
- Students researched different viewpoints in developing and operating an MIS.
- Students reviewed lessons with interactive games using Kahoot. These games are Students reviewed lessons with interactive games using Kahoot®. Students created the games themselves under teacher guidance. After each game, the lecturer posed questions on the wrong or unclear answers, encouraging students to discover more on the missed points.

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ALIEN LABORATORY ORATORY EXPLOITATION PLAN

- Students played scenario games in which they provided input related to the practical application of knowledge and techniques in developing and operating an MIS.
 - Students used Office® software, modeling tools, and Dropbox® to build and share their results within their classmates and lecturer.
 - Students worked in groups on aspects related to the development of an MIS modeling and development plan and presented their findings to the teacher and their classmates.
 - Students summarized their results in a commonly owned shared document.
 - Students raised concerns or interests during the course and engaged in discussions with their classmates in the final session. The lecturer helped students align their points with the framework of the course for developing more effective understanding of concepts and enabling student to apply new knowledge in practice.
6. Network Programming: The course is part of the ICT undergraduate program at Vietnam Germany University and University of IT - VNUHCM. 35 students enrolled in semester 2 of academic year 2018 - 2019 and 42 students enrolled in semester 2 of academic year 2019 - 2020. The lecturers of the course are Dr. Huy Nguyen (JVN) or Dr. Nam Nguyen (UIT-VNUHCM).

Students implemented the following steps and activities:

- Students worked in groups on coding Java programs to fulfill system requirements provided by the lecturer.
- Students designed their own solutions based on theoretical frameworks and recommendations introduced through lectures.
- Students researched different models for building effective communication applications.
- Students reviewed lessons with interactive games using Kahoot®. Students created the games themselves under teacher guidance. After each game, the lecturer posed questions on the wrong or unclear answers, encouraging students to discover more on the missed points.

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ALIEN LABORATORY ORATORY EXPLOITATION PLAN

- Students played scenario games in which they provided input related to the practical application of knowledge and techniques in developing networks.
 - Students used Eclipse®, Java, and Dropbox® to build and share their results within their classmates and lecturer.
 - Students worked in groups on aspects related to the development of an MIS modeling and development plan and presented their findings to the teacher and their classmates.
 - Students summarized their results in a commonly owned shared document.
 - Students raised concerns or interests during the course and engaged in discussions with their classmates in the final session. The lecturer helped students align their points with the framework of the course for developing more effective understanding of concepts and enabling student to apply new knowledge in practice.
7. Methodology and Skill for Scientific Research: The course is part of both the ICT and QCF graduate programs at John von Neumann Institute. This course is also offered in the ICT graduate programs at the University of Natural Sciences - VNUHCM and the Polytechnic University of Ho Chi Minh City. 39 students enrolled in semester 2 of academic year 2018 - 2019 and 32 students enrolled in semester 2 of academic year 2019 - 2020. The lecturers of the course are Prof. Bao Ho (JVN), Prof. Vu Duong (JVN), Dr. Huy Nguyen (JVN), Dr. An Mai (JVN) and Dr. Quang Nguyen (JVN).

Students implemented the following steps and activities:

- Students studied the phases of the scientific writing process. They worked in groups on a topic of their choice.
- Students selected their own approach for writing and presenting their work, which was structured as a research paper.
- Students researched related scientific articles and other documents. They discussed their findings under the guidance of the lecturer. They prepared and delivered a presentation of their work for the benefit of their classmates and the lecturer.

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13

ALIEN LABORATORY ORATORY EXPLOITATION PLAN

- Students reviewed lessons with interactive games using Kahoot®. Students created the games themselves under teacher guidance. After each game, the lecturer posed questions on the wrong or unclear answers, encouraging students to discover more on the missed points.
- Students played scenario games in which they provided input related to the practical application of knowledge and techniques in identifying a research topic of interest, researching the context of the work, and preparing a written research proposal.
- Students used Office® software and Google® class to develop presentations and share their results within their classmates and the lecturer.
- Students worked in groups on selecting a research topic and performing a literature review.
- After each important milestone of the project students prepared and presented a progress report that was evaluated by their classmates and lecturers.
- Students executed exercises and tests for evaluating and improving soft skills in the digital age, such as creative thinking, active listening, and team work.
- Students summarized their results in a commonly owned shared document.
- Students raised concerns or interests during the course and engaged in discussions with their classmates in the final session. The lecturer helped students align their points with the framework of the course for developing more effective understanding of concepts and enabling student to apply new knowledge in practice.

Following is a list of courses in which the laboratory will be used in the next intakes or semesters:

1. Advanced Programming in Finance: The course is offered in the 1st semester of the QCF graduate program. It enrolls 20 students. The course is delivered by 1 lecturer and 1

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14

ALIEN LABORATORY ORATORY EXPLOITATION PLAN

academic assistant. Both will use the laboratory. The pedagogical approach of this course is learning by examples and practical enhancement through exercises and mini projects.

2. Numerical Methods in Finance: The course is offered in the 2nd semester of the QCF graduate program. It enrolls 20 students. The course is delivered by 1 lecturer and 1 academic assistant. Both will use the laboratory. The pedagogical approach of this course is increasing direct interaction through practical projects to help students understand better the theoretical issues.
3. Business Process Modeling: The course is offered in the 2nd semester of the ICT graduate program. It enrolls 20 students. The course is delivered by 1 lecturer and 1 academic assistant. Both will use the laboratory. The pedagogical approach of this course is learning by applying the theoretical issues in real contexts and practical enhancement through mini-projects.
4. Data Modeling: The course is offered in the 2nd semester of the ICT graduate program. It enrolls 20 students. The course is delivered by 1 lecturer and 1 academic assistant. Both will use the laboratory. The pedagogical approach of this course is learning by applying the theoretical issues in real contexts and practical enhancement through mini-projects.

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15



4. Resources

4.1 Equipment



The laboratory includes equipment was purchased through the ALIEN project as well as equipment purchased through other JVN resources.

The equipment purchased through the ALIEN project is the following:

5. 1 server for computational and storage purposes. This server has VMWare installed to create virtual machine for different platform requirements emerging in courses.
6. 1 switch for high speed and extensible connection between users and servers if required. Typically, it is used when a larger number of students joins a class.

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ALIEN LABORATORY ORATORY EXPLOITATION PLAN

7. 1 high speed WiFi hub for mobility in working groups.
8. 1 smart board used as a display. It creates a highly interactive working environment in the laboratory.
9. 1 workstation for the lecturer.
10. 4 high performance laptops with touch screens for students.

The following equipment is provided by JVN:

- Working space: Co-location with the data science laboratory in an area of 50m². This area is air conditioned and appropriately lit.
- Furniture: The laptops and electronic devices are installed on a table with chairs. It can support a group of 5 - 10 students.
- Internet connection: The laboratory is equipped with a high speed Internet connection with a VPN enabled switch to support remote connection.
- Power supply: The laboratory is equipped with sustainable power supply in the IT Park where JVN is located.
- The laboratory is protected by hardened doors and windows with fingerprint authentication. The laboratory is cleaned daily.

4.2 Staffing

The support team is comprised of:

- A technician who has a clear understanding of the equipment and the usage of the laboratory. The technician is in charge of maintaining equipment as well as supporting laboratory users. When using the laboratory, lecturers are provided with a hotline through which they may contact the technician for help.
- A researcher who has experience in applying active learning. The researcher further has experience on using this laboratory in courses.

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ALIEN LABORATORY ORATORY EXPLOITATION PLAN

- Lecturers who can flexibly use the equipment and software available in the laboratory in the laboratory to create activities for classes.
- Cleaning staff that keeps the laboratory clean for daily use.

JVN employs a technician and cleaning staff to maintain and ensure good working conditions in the laboratory. For the laboratory operation JVN selected a researcher from the QCF program to support the registration and reporting processes. Moreover, JVN has a culture of self-discipline in using and protecting the working environment for the benefit of all.

4.3 Financial support

The expenses for operating the laboratory include staff costs, Internet connectivity costs, power supply costs, and updating and maintenance of equipment. These costs are managed and controlled according to JVN's regulations on budget registration and payment.

After the completion of the ALIEN project, the laboratory will continue to be used under the management of JVN. All expenses are covered by JVN budget.

Benefits from using the laboratory include quality improvement of the courses, satisfaction enhancement of students, better interaction between lecturers and students, and, most importantly, opportunities for students to become more active and innovative in applying their knowledge and skills in practical contexts. These benefits are significant and justify covering the laboratory expenses through the JVN budget. Each newly admitted class of students is assessed as more competent by companies and JVN's industrial partners as a result of active learning. This helps JVN achieve a better reputation in academics and research.

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