



Exploitation plan for
problem-based learning laboratory

UNIVERSITI TENAGA NASIONAL

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1. Name of the lab

The proposed name of this lab is 'Active Learning Lab'. It is used for any activities related to the promotion of active learning in technological courses, be it research or academic activities. It is the extension of the existing problem-based learning lab, with the additions of the workstations and other facilities bought under this grant.

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2. Faculty in which the lab belongs

The lab is currently located at Level 2, BM building at the College of Engineering, Universiti Tenaga Nasional (UNITEN). Shown below is the organogram of the organization in which the lab fits.

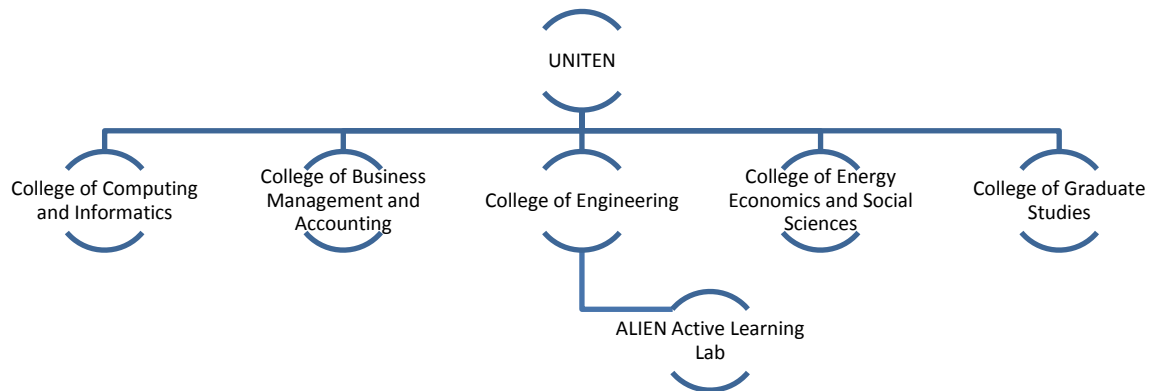


Figure 1. UNITEN organogram, demonstrating the location of the ALIEN lab in the organization.

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3. Purpose of the lab

The lab will be used to facilitate teaching and learning activities. It will also be used to conduct trainings, workshops and AL/PBL activities during classes.

3.1 Guidelines for use

The followings are the instructions for educators who wish to use the lab.

- Apply existing booking procedure, fill up online approval form. The educators should provide purpose, brief description of the activities, and number of students. The lab can be used once permission is obtained from the Deputy Dean’s office.
- During the lab sessions, educators are responsible to maintain a good housekeeping.
- Upon completion of use, the educators and students are to fill up online feedback forms
- The scenario of how the lab can be used can be found in the ALIEEN project Institutional Strategy, available at <http://projectalien.eu/index.php/project-reports/>.

3.2 Activities and courses

The table below shows a list of courses in which the lab is currently used and will be used in the future.

	Course name	Current	Future	Description
1.	Software Quality	✓	✓	Students are divided into groups to accomplish tasks obtained from the ALIEEN PBL platform. The computers are used by the groups to access resources needed to perform the tasks.
2.	Fundamental of Software Engineering		✓	Students work in groups to play a digital serious game developed by UNITEN to train them on requirements gathering

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	Course name	Current	Future	Description
				and analysis. The computers are used to play the game.
3.	Requirement Engineering	✓	✓	Students work in groups to play the digital serious game developed to train them on requirements gathering and analysis. The computers are used to play the game.
4.	System Analysis and Design		✓	Students work in groups to play the digital serious game developed to train them on requirements gathering and analysis. The computers are used to play the game.
5.	Fundamental of Software Engineering (Diploma)		✓	Students work in groups to play the digital serious game developed to train them on requirements gathering and analysis. The computers are used to play the game.
6.	System Analysis and Design (Diploma)		✓	Students work in groups to play the digital serious game developed to train them on requirements gathering and analysis. The computers are used to play the game.
7.	Power System (Diploma)	✓		PBL activities on per-unit topic. Students are divided into groups to solve assigned problems. The computers are used to obtain resources from the internet.
8.	Power Electronics (Diploma)		✓	MATLAB Simulink is installed on the computers. The students design and build converter models as per requirements given. Then, they present their findings in the class.
9.	Mechanics II: Dynamics	✓		Demonstrations for kinetic motion are conducted in the lab. Students are to

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	Course name	Current	Future	Description
				solve the problems based on the mechanism shown during the activity.
10.	Manufacturing Processes Laboratory		✓	Welding activity via augmented reality is introduced to students in the lab. At the end of the session, students produce a report based on the activity.
11.	Object-oriented Programming	✓	✓	Students are divided into groups and upon confirming a topic/problem to be solved, students are asked to identify system requirements by referring to existing systems the description of which can be discovered on the internet using the computers in the lab. The group then is asked to write a program to implement the identified requirements to produce the system solution by using the IDE installed in the lab.
12.	Fundamentals of Data and Information	✓		[During pandemic COVID-19: virtual learning] Using Telegram as main communication channel for announcements and discussions, flipped classroom method, peer reviewing, and active learning using online discussion tools such as Padlet.
13.	Algorithmic Problem Solving	✓		[During pandemic COVID-19: virtual learning] Students are assigned a problem to be presented in pairs through a video, in a game-playing method instead of a formal presentation. Prior to that, students are to sit in a lecture session on algorithm techniques. A pre-recorded video is also available in the

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	Course name	Current	Future	Description
				university LMS so that students can refer to the techniques at their own time. The problem question is uploaded onto the Moodle LMS platform and MS Teams assignment so that students can easily access the question.
14.	Data Communication and Network	✓		[During pandemic COVID-19: virtual learning] One of the topics is network planning for IPv4 where students are to design a network based on some criteria and requirements in groups. One group consists of four to five students. The problem is shared on the official LMS platform, Moodle, Padlet and also uploaded onto the ALIE PBL platform so that the students can conveniently access the problem.
15.	Physics for Engineering			[During pandemic COVID-19: virtual learning] One of the topics chosen to be covered using active learning methods is thermodynamics where students are given learning resources in the form of lecture notes or lecture videos. One group comprise of three to four students. The problem is also uploaded onto the ALIE PBL platform so that the students can easily access the problem and that the problem can also be shared with other instructors. Students are required to complete the given crossword puzzle by actively search for the keywords or

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	Course name	Current	Future	Description
				descriptions of the terms in either lecture note or lecture video. With the COVID-19 pandemic, the activity is slightly modified such that the students discuss among themselves using virtual communication platforms.
16.	Numerical Methods for Engineers	✓		<p>[During pandemic COVID-19: virtual learning]</p> <p>How a one-hour lecture is conducted: Warm-up exercises and questions (Facebook, Telegram), lecture, answering the given questions, lecture, and conclusion with a short quiz/discussion.</p> <p>Small group project: students are assigned open ended engineering problems to be solved using numerical methods and mathematical software installed in the lab. One of the activities in the group project is to present their findings to the class.</p>

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4. Resources

4.1 Equipment

The equipment available in the lab includes the 11 workstations bought for active learning use, a projector, and existing furniture and wall mounted widescreens. Details are as below.

- 1 High-spec game development PC.
- 1 EPSON EB-X05 projector.
- 10 Tower desktop gaming PCs.

4.2 Staffing

An admin executive has been appointed as a manager, to handle the booking, housekeeping, and the well-being of the lab. At least 10 trainers are expected to utilize the facilities in the lab. Two technicians have also been assigned. They are in charge of maintaining the equipment. All staff is already employed by the organization.

4.3 Financial support

After the project is completed, to sustain the lab operations, the OPEX financial resources will be covered by different departments in the university as follows.

- Staff costs will be handled by UNITEN's Human Resource.
- Upgrading of furniture and equipment (where and if necessary) will be handled by the Facility Development and Management Dept.
- Upgrading and updating of hardware and software will be handled by the IT and Multimedia Services Dept.

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