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INTELLECTUAL OUTPUT 2

Non-Formal and Work-Based Employment Trial Program

The Project Partners

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ABSTRACT

This intellectual output presents the collaborative work of the project partners under the project name (as stated above) and the project number **2020-2-TR01-KA205-095580**, supported by Turkish EU Agency. This output outlines the contents of work-based employment trial program, which is usually/globally called as “internship”, where based on the objectives of this project, this report outlines the essentials of creating an internship program for IT companies to employ young IT talents in their workforces. There are diverse internship components listed in this report which can assist creation of short or long term internships in any type of IT company, as a comprehensive guide with all the necessary components. At the last part, there is an internship program example called “Non-Formal and Work-Based Employment Trial Program”.

Legal warning

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Why to provide internships in IT sector?

If EU is to attract and recruit competitive advantage, innovative and high-tech indigenous IT sectors (data analysing, software design, data tracking etc.) and properly transition into a digital world, youth (as age 18-25 and being digital natives) are great resources that would otherwise fit excellently the IT mindset, skills and attitude needed, based on the environment they have grown up where they are users and consumers of digital media, highly connected in a world of social media, adaptable to constant technological changes and so on. They would play crucial roles in changing the equilibrium skewed towards IT human capital attainment which need is directly related to EU 2020 strategies for smart and sustainable economy and EU Digital Action Plan (2019).

Benefits of internships

Internships allow people the opportunity to apply their knowledge and skills in a professional setting. Internships offer carefully planned and monitored work experience with the goal being to gain additional knowledge from on the job exposure.

Internships may also be part of an educational program in which students can earn academic credits from their educational institutions. Internships may be arranged independently from the curriculum in which students would gain work experience only.

Benefits to IT companies

- Immediate assistance to support projects
- Interns will provide new ideas and viewpoints
- Salary Savings = No cost or minimum cost to the companies
- Effective public relations for IT companies with the educational institutions or directly with IT skilled youth
- Recruitment and Workforce Planning where IT companies may find very talented and appropriate workforce among interns

- Educational institutions and IT companies' ties are strengthened and communication is improved
- Other IT company employees can be relieved from performing minor or routine tasks allowing them to perform higher priority work
- Interns may energize a workplace with their enthusiasm and desire to learn

Benefits to Young IT talented job seekers (students, graduates etc.)

- Career related practical experience
- Gains practical knowledge about various IT tools, materials, software and technical items
- Opportunity to explore career avenues within IT sectors
- Valuable work experience for their resumes
- Potential to earn academic credit if desired
- Increased self-confidence which helps young interns to go further in their professionalism
- Enhances conventional classroom learning methods with various practical, work-based learning scenarios which can be a significant gain for interns
- Letter of recommendation from IT companies based on the internships which can open up many new career opportunities for interns
- Obtain references from co-workers where they can be role models, mentors and support professionals for young interns to pursue their careers further.

Internship Coordinator (at IT companies)

The Internship coordinator should:

- Conduct on-campus and online recruiting to ensure that young people (whether still studying as students or graduates) are aware that IT company is offering internship opportunities
- Advertise the company's recruitment opportunities
- Coordinate the recruiting and screening of year-round intern applicants
- Assist in the selection of interns
- Promote internship opportunities within the various departments of companies
- Serve as the contact regarding the internships
- Review and revise the company's internship procedures as needed

Interns

Internships allow interns the opportunity to apply their knowledge and skills in a professional setting at IT companies.

Internships offer carefully planned and monitored work experience with the goal being to gain additional knowledge from on the job exposure.

How to Begin

Interns should:

- 1) Analyze their skills, values and interests to determine the location and working environment desired.
- 2) If still at education, should check with their department for college/department qualifications and requirements on academic credit.
- 3) Prepare a resume and cover letter and have them critiqued with professionals.

4) Network with experts in the field, companies who recruit young talents, stakeholders etc.

Responsibilities

Interns should:

- Adhere to company policies, procedures, and rules governing professional behavior.
- Be punctual, and work the required number of hours at times agreed to by the intern and their company supervisor.
- Notify their company supervisor if they are unable to attend as planned.
- Behave and dress appropriately to the particular workplace.
- Respect the confidentiality of the workplace, its clients and its employees.
- If things are slow, take the initiative and volunteer for different tasks or other work.
- Discuss any problems with their company supervisor.

Intern Rights

Unpaid interns have the same legal rights as other company employees in regards to protection against discrimination and harassment. However, interns do not have the same rights as the company employees in the realms of unemployment compensation or termination procedures.

Internship Completion

At the end of the internship:

- The intern company supervisor will provide the intern with a letter of recommendation.

- The Intern will evaluate the overall internship experience. The evaluation form must be returned to the company internship coordinator.

Supervising an Intern

An intern must have a designated site company supervisor who is responsible for providing orientation and supervision. This should be someone who will be available to the intern on a regular basis, and who possesses expertise in the area in which the intern will work. Even if the intern will rotate through various departments in order to gain broad-based experience, there still should be a single overall supervisor who oversees the internship as a whole. When choosing a company supervisor, it is important to choose someone who is interested in working with interns; has the time to invest in the internship, especially during the first few weeks; and possesses qualities such as leadership, strong communication skills and patience.

Because an internship is defined as a learning experience, proper supervision of the intern is essential. The supervisor serves as a teacher, mentor, critic, and boss. Ongoing supervision of the intern is the key to the success of the internship. This is especially true for young interns who do not have extensive work experience. Acknowledging and identifying the different expectations between the workplace and school can help interns make a successful transition to the world of work.

An effective method of intern supervision is to have a set time (bi-weekly is recommended) to meet with the intern to review progress on projects, touch base, and provide feedback. Some supervisors do this over lunch; others choose a more formal setting.

The supervisor will oversee and assign the intern's work. Supervisors will need to monitor the intern's time and submit an intern evaluation form along with a letter of recommendation.

How to Begin

To determine if an intern is the right choice for your company, ask yourself the following questions:

- Do you have a specific project or assignment that will provide a quality working and learning opportunity for an intern?

- Can you commit time to develop an intern, promote community goodwill, and offer insight into your company?
- Can you benefit from the latest technology, perspectives, and relevant skills being used in your company?
- Do you want to help mold the future of your company's talent?

If you answered yes to all of these questions then you are ready to support an intern!

Hiring an Intern

Step 1: Determine if an intern is right for your company (see questions above)?

Step 2: Determine the best time to hire an intern for your company

Step 3: Determine the scope of work or project/assignment the intern will be working on. Complete the Intern Proposal Form and attach a Duty Statement for the intern position. Submit documents to the internship coordinator.

Step 4: Prior to internship employment, the hiring department division shall verify the employment eligibility and identity of all employees hired to work: • Reference check • Background check (if required)

Training

Training is as important as supervision. Establish a training program that will give the intern a clear understanding of what is expected, and include information about the duties that will be supervised and evaluated. Refer to the internship duty statement. Each office will designate a supervisor to oversee and assign the intern's work. Discuss the following with your intern:

- What will the specific duties/responsibilities of the intern be
- How will you provide the intern with regular feedback, guidance, and support

- What training will the intern receive (if applicable)
- What will the intern need to do if they will be absent from work

Orientation

Establish goals and objectives, and clarify these goals and objectives before the intern begins working. Some interns need more guidance than others, and many factors must be taken into consideration. Consider the intern's cultural background, disabilities, learning style and experience. Evaluate his or her level of maturity and confidence. Is the intern a critical thinker or a creative problem-solver?

Plan to include the following in your orientation:

- Information about the company where interns should review documents that are important for them to understand the big picture. If available, include a company chart that explains various roles and responsibilities of employees.
- Structure. Interns might not be familiar with formal workplace procedures (e.g., attendance policies, break times, days off). Make sure to clarify relevant policies and procedures to interns on their first day.
- Introductions. Take time in the beginning of the internship to introduce the intern to the people in your company and particular departments. Allow more time for conversation with those employees who are likely to interact with the intern on a regular basis. Some interns, based on personality or culture, may be reluctant to seek out co-workers on their own. By making a special effort to encourage those contacts early on, interns will feel more comfortable asking for advice or support later. The interns would appreciate any opportunity to learn new skills or increase their knowledge. Developing a plan for training throughout the internship will keep them interested in the position and ready to tackle new challenges.

Ongoing training may include the following:

- Skill development. There may be a need for training in specific skills such as computer programs, office equipment, or other tasks directly related to the job. Even bright individual interns with great potential/credentials will struggle if they are not instructed in the specifics related to successful completion of duties. (remember that IT fields are complex, have very sensitive data and require a great attention to details)
- Shadowing. Allow interns to participate in activities and meetings. Interns may have leadership potential but not understand the culture of your company. They will rely on their supervisor to educate them.
- Questions. Interns might not know when to speak or how or what to ask. Assist them in actively learning by explaining and clarifying everything. Suggest and encourage questions at appropriate times.
- Professional conferences or association meetings. If possible, offer interns the opportunity to attend training or networking events. It helps interns to get a feel for the overall mission of your company, and at the same time make them feel that they are valued.

Mentoring

A mentor is a counselor, guide, tutor, or coach. Valuable internship experiences not only include effective supervision, but also, a large component of mentoring. Most interns seek out internships in order to develop their own career goals.

Mentors help guide interns through their experience. This may mean allowing or encouraging the student to participate in events that may not normally be open to entrylevel professionals, such as certain staff meetings, client consultations, or other workrelated events. Even though these events may not be directly tied to the intern's specific job duties, they will help provide a broad overview of your business or company.

A mentoring relationship is valuable for both the intern and the professional. The intern has the opportunity to consider his or her experience. The mentor can pass on a wealth of experience and knowledge, and benefits from a fresh viewpoint and new ways of thinking.

Evaluations

Evaluation is important to an intern's development and is an opportunity to identify strengths and weaknesses. It is helpful if supervisors evaluate throughout the entire internship, not just at the end. The evaluation should be planned as a learning experience and an opportunity for two-sided feedback. Regularly scheduled evaluations help avoid common problems with internships, including miscommunication, misunderstanding of job roles, and lack of specific goals and objectives. You may find it helpful to schedule a preliminary evaluation early in the internship (in the second or third week). This will help you understand whether the intern's orientation and training was sufficient or if there are specific areas in which the intern has questions or needs further training.

Criteria to consider when evaluating an intern:

- Progress towards or accomplishment of learning objectives as stated in the learning agreement.
- Skill development or job knowledge gained over the course of the internship.
- Overall contribution to the mission of the organization.
- Dependability, punctuality, attendance.
- Relations with others, overall attitude.
- Potential in the field.

The intern will also evaluate the internship experience, which is important in determining the value of the work experience for future interns. Categories might include:

- Was there educational value or merit in the assignment?
- Did the position live up to its initial description?
- Was the supervisor receptive to your ideas?
- Does the experience relate to your major or career goals?
- Did you receive a proper job orientation?
- Was the supervisor willing and/or capable of answering questions?
- Did you develop good work habits?

Internship Completion

An internship should have a clearly stated end date that is identified before the internship begins. Completing a formal evaluation process such as the one described above can help both the site supervisor and the intern bring closure to the experience. A letter of recommendation from the

Intern supervisor shall be given to the intern on the last day of work. You also may want to have some form of acknowledgment such as a lunch with coworkers in the final week of the internship. Because co-workers often have extensive contact with interns, this type of event can be a positive way to recognize the contribution of other employees as well as the intern. At the end of the internship, the intern supervisor will:

- Provide the intern with a letter of recommendation.
- Complete the assessment of the intern's progress and skill development.

Intern Checklist

Once Hired

*Complete all necessary forms needed for new intern

*Determine training needed

*Orientate intern with the specific company department

o Information about company

o Structure

o Introductions to staff

o Inform intern of staff meetings, work-related events, etc

o Give intern the tools to do the job: desk, computer, chair, access to tools, passwords, etc.

o Tour of department, division, unit

o Where do they go for help or if there is a problem

o Calling in sick, etc.

*Supervision

o Determine how often you will meet with the intern (recommend weekly or bi-weekly)

• Must be regular

• Must be reciprocal

*Encourage good work habits from the intern (make clear expectations)

*Continue to identify training needs

*Revisit learning agreement as needed

Successful Internships

Discuss the following with your intern:

*What will the specific duties/responsibilities of the intern be

*What are your (supervisors) responsibilities during the internship

*How will you provide the intern with regular feedback, guidance and support

*What training will the intern receive (if applicable)

*How (and when) will the intern be evaluated

*What will the intern need to do if they will be absent from work or if they are sick who do they need to notify, how and when

During the regular intern/supervisor meetings, as well as with the mid and final evaluations, you should discuss with the intern:

*How well they are meeting the goals/responsibilities

*How they are doing developing professional skills related to the field

*Areas they need to improve on

*Suggestions for ways to improve (further training, specific courses, etc.)

*Overall performance

*Other issues that may need to be addressed

Evaluations

Evaluations are an essential part of any internship. An evaluation helps the intern to acknowledge work strengths and areas for improvement. For supervisors, evaluations are helpful in evaluating the internship as well as identifying areas where there could be improvement or modification.

*Mid/Final internship evaluations

o Reviewed between intern/supervisor

o Two-sided feedback

- Interns evaluation
- Supervisor evaluation

o Will be used to collect data on internship program & identify areas for improvement, etc.

- o Will be used for intern portfolios/CV
- Show evaluations during job interview

Before intern leaves

Before the internship is complete there are a few things you will need to go over with your intern:

*Write a letter of recommendation

*Finish any evaluations required

*Make sure the intern returns any department property

*Have intern leave contact information (if you think they may be someone you would want to contact about upcoming positions)

*Make sure intern keeps up the momentum (they should not slack off the last couple of weeks)

*Say “Thank You”

PROCESS TO OBTAIN AN INTERN

STEPS

1	IT company or others	Needs an intern
2	Program	Completes <ul style="list-style-type: none"> • Internship Proposal Form, and • Student Intern Duty Statement
3	Company Internship Coordinator	Submits proposal to Internship Coordinator or any responsible person/entity
4	Company Internship Coordinator	Composes internship position flyer <ul style="list-style-type: none"> • For college's career centers, and • State department public website
5	Company Internship Coordinator	Posts student intern position information on webpages related to intern recruitment, on state department public website, on private webpages, platforms etc.
6	Company Internship Coordinator	Receives all student resumes for tracking purposes
7	Company Internship Coordinator	Reviews resumes and selects who they will interview
8	Company	Conducts <ul style="list-style-type: none"> • Interviews • Reference check • Background check (if required by program)
9	Company Internship Coordinator	Chooses • student to hire, and offers internship
10	Company Internship Coordinator	If necessary, he/she Notifies Internship Coordinator of intern hire (ex.university), provides student name, start and end date.
11	Company	Closes job announcement made on the webpages and other platforms
12	Education Provider (ex.University)	If necessary by the University, he/she will provide a form shows that this student is interning a certain number of hours at the state department

13	Company intern supervisor	Has intern completed all necessary new hire forms
14	Intern and Company intern supervisor	Each will complete an evaluation of the internship and submit to Internship Coordinator.
15	Company intern supervisor	Writes letter of recommendation for student at end of internship

FREQUENTLY ASKED QUESTIONS

Intern FAQ:

Why should I look at an internship?

Internships allow newly graduated or undergraduate students the opportunity to apply their knowledge and skills in a professional settings. Interns will gain valuable work experience and the opportunity to explore career avenues, especially considering IT sectors where there are constant developments, upgrades and fast paced developments.

How do I find an internship?

Today, most of the internship opportunities are published at job searching platforms, at private company webpages, at other online platforms, along with advertises by universities (with companies where there are university partnerships).

How do I earn academic credit for my internship?

Most of the IT companies do not provide academic credits for interns, this is because of their purpose in developing internships where they focus on training and employing interns in their workforces, rather than serving as an education provider for academic credits. It would be best to contact the companies beforehand to learn more.

Is my internship paid?

There are different types of internships which can be paid or unpaid. It is best to learn which type of internship IT companies provide beforehand.

What happens at the end of my internship?

You will receive a letter of completion and recommendation from the company internship supervisor or directly from the company owner. You would have the opportunity to talk about further employment opportunities at the company you have done an internship, and the hosting company will have the chance to evaluate your skills, qualifications, personality, your fit for the company and more. This would land a job opportunity for the intern at the end.

Company Internship Supervisor FAQ:

How do I request an intern?

One of the way is to contact with Universities' related departments to ask for interns by completing official paperwork such as The intership proposal form or a Duty statement, then forward the forms to the Universities' internship coordinators.

You can request interns directly via advertisements on your webpage, from job platforms, from online recruitment platforms, from private intern finding companies, from advertising on social media platforms and so on.

How long can I keep my intern?

Internships vary depending on the companies internship programs, which can last from 1 day to many years, depending on the purpose, complexity of the job, required learning subjects, period of the year (summer/spring etc.). There needs to be arrangements between companies and interns considering each company's internship program/schedule.

Can companies get interns with an unpaid internships in IT?

This is directly depended on the arrangement between companies and interns where any kind of agreement is possible (whether paid or unpaid)

How do I prepare for my intern?

By following the steps described on this report, you can prepare your company for recruiting interns by knowing what to do, how, when and by completing the necessary forms.

What if I have a “problem” intern?

Sometimes the company and the intern, or the experience and the intern are not a good fit. In this case or in any case, both sides have right to withdrawn their participation from the internship program. Remember that this is a mutual agreement between IT companies and individual interns where any kind of agreement can be made depending on the situations.

AN EXAMPLE OF INTERNSHIP PROPOSAL FORM FOR THE IT COMPANIES

Internship Proposal Form

Companies interested in hiring an intern should complete this form

Date:	
Company Department	
Company Intern Supervisor Name:	
Company Intern Supervisor Phone:	
Company Intern Supervisor Email:	
Company Intern Supervisor Office Address:	
Internship Job Title:	
Requested Start Date:	Requested End Date:
Intern hours per week:	

Approval Signatures:

.....
Company Intern Supervisor/Manager, Date

Position Description: This information will be used to create an intern position description that will be posted on various websites. So, please be as concise and specific as possible. Students will apply for internships based on this information.

INTERN ATTENDANCE AGREEMENT

Excellent attendance is an expectation of all interns. When you need to be absent or if you need to modify your schedule, please notify your company supervisor as soon as possible.

Start Date	
End Date	
Total Hours per week	
Work Schedule	

.....
Intern Signature

Date

.....
Company Supervisor Signature

Date

FORM TO BE COMPLETED BY INTERN

INTERN EVALUATION FORM

Name of the Company _____

Department/Division of the Company _____

Starting and Ending Dates From _____ to _____

Intern's Name _____

Company Supervisor Name _____

Please rate the following aspects of your Internship placement on the basis of this scale:

Excellent (Consistently exceeds expectations)

Good (Sometimes exceeds expectations)

Average (Meets expectation)

Poor (Rarely meets expectations)

N/A Not Applicable (Not applicable to this internship experience)

Select one evaluation level for each area by marking an "X" under the level that represents the internship.

	Excellent	Good	Average	Poor	N/A
Adequacy of company supervision					
Helpfulness of company supervisor					
Acceptance by fellow workers					
Opportunity to use my knowledge					
Opportunity to develop my technical IT skills					
Provided levels of responsibility consistent with my ability and growth					
Opportunity to develop communication skills					
Opportunity to develop my human relations skills					
Cooperativeness of fellow workers					
Opportunity to problem solve					
Opportunity to develop critical thinking skills					
Provided orientation to the company and its operations					
Attempt to offer feedback on my progress and abilities					

	Excellent	Good	Average	Poor	N/A
Effort to make it a learning experience for me					
Gave me a realistic preview of my field of interest					
Adequate training					
I feel I am better prepared to enter the world of work after this experience					
I felt I was productive for the department					
My internship experience:					
Confirmed my interest in a career in this line of work					
Has made me decide to pursue a different career path					

Comments:

Would you work for this supervisor again? Yes No Uncertain

Would you work for this agency again? Yes No Uncertain

Would you recommend this agency to other students? Why or why not? Yes No Uncertain

Intern's signature

Date

Thank you very much for completing this evaluation of your internship. We take your comments very seriously. Please return this evaluation to the company internship supervisor.

COMPANY INTERNSHIP SUPERVISOR EVALUATION FORM

Name of the Company _____

Department/Division of the Company _____

Starting and Ending Dates From _____ to _____

Intern's Name _____

Company Internship Supervisor Name _____

Do you permit the intern to receive a copy of this evaluation? Yes ___ No ___

Please rate the following aspects about the intern on the basis of this scale:

Excellent (Consistently exceeds expectations)

Good (Sometimes exceeds expectations)

Average (Meets expectation)

Poor (Rarely meets expectations)

N/A Not Applicable (Not applicable to this internship experience)

Evaluation of personal qualities of the intern observed during the internship. Select one evaluation level for each area by marking an "X" under the level that represents the intern's performance.

	Excellent	Good	Average	Poor	N/A
Ability to learn					
Observes and/or pays attention to others					
Asks pertinent and purposeful questions					
Seeks out and utilizes appropriate resources					
Accepts responsibility for mistakes and learns from experiences					
Open to new experiences; takes appropriate risks					
Reading/Writing/Computation Skills					
Reads/comprehends/follows written materials and instructions					
Communicates ideas and concepts clearly in writing					
Works with technical IT procedures appropriate to the job					

Attention to accuracy and detail					
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	Excellent	Good	Average	Poor	N/A
Listening & Oral Communication Skills					
Listens to others in an active and attentive manner					
Comprehends and follows verbal instructions					
Effectively participates in meetings or group settings					
Demonstrates effective verbal communication skills					
Creative Thinking & Problem Solving Skills					
Seeks to comprehend and understand the “ big picture”					
Breaks down complex tasks/problems into manageable pieces					
Brainstorms/develops options and ideas					
Respects input and ideas from other sources and people					

	Excellent	Good	Average	Poor	N/A
Interpersonal & Teamwork Skills					
Relates to co-workers effectively					
Manages and resolves conflict to a team atmosphere					
Supports and contributes to a team atmosphere					
Controls emotions in a manner appropriate for work					
Basic Work Habits					
Reports to work as scheduled					
Is prompt in showing up to work and meetings					
Exhibits a positive and constructive attitude					
Dress and appearance are appropriate for this organization					

	Excellent	Good	Average	Poor	N/A
Character Attributes					
Brings a sense of value and integrity to the job					
Seeks to serve others					
Refrains from gossip/respects the privacy of others					
Behaves in an ethical manner					

Comments:

Would you supervise this intern again? Yes No Uncertain

Would your agency host this intern again? Yes No Uncertain

Would you recommend this student to other organizations? Why or why not?

____ I have ____ I have not discussed this assessment with the intern.

Evaluator's Signature: _____

Date: _____

Title/Position: _____

Telephone/email: _____

Non-Formal and Work-Based Employment Trial Program

This program has been created to help companies to provide “employment trial program” for young IT interested/skilled people. This program has been designed as a short term program (any company can extend the program into a longer period as they wish). This short term program will serve to IT companies to provide quick employment trial support.

To make this employment trial program more clear, obscure and understandable, **AS AN EXAMPLE**, we have chosen an IT field of “cyber security” as the specific IT subject. Because, IT field is massive, there are hundreds of IT fields where we had to choose 1 specific subject to create this employment trial program, which will serve as an example for companies to create similar employment trial programs for various IT fields of their interest (by using the forms created in this report and by using the contents, by answering the questions listed in this report)

Duration

Please determine the duration of the employment trial program, where the companies can create; 5 days, 10 days, 1 month, 2 months and longer programs based on their program needs. It would be better to determine the number of working hours per day.

An example;

Duration of the employment trial program: 5 days/30 days etc.

Number of working hours per day: 8 hours from 9am to 5 pm.

Minimum Eligibility

Please determine the minimum eligibility requirements for the internship program, based on IT company’s purpose, target and aims. Since IT field is massive, there are many different eligibility requirements of each particular IT field, therefore please define the criterias. For instance;

Minimum eligibility for a software developer internship program:

Graduate/PG (Pursuing & Pass out)/Professionals/ Master’s Degree

Undergraduates with software security course completion etc.

Age between 18 to 45.

Language requirements: Ex. English, French etc.

Good knowledge of Linux, C++ etc.

Curious, autonomous and analytical etc.

Course format?

Describe the course format. Is it face-to-face, online or blended?

How many contact hours?

Does it have lectures, lab sessions, or discussion sessions?

Content of the Employment Trial Program

Company

Please describe your company in terms of the details about what it does, how, where, the team, the scope, the mission, working conditions, customer profile, working areas, operational information and so on.

For instance for cyber security field as an example:

SERMA Group is a holding that has subsidiaries offering services in 5 domains:



SERMA Safety & Security (S 3) is one of these subsidiaries. It was created in 2015 as a merger between the safety business unit of SERMA Engineering and the ITSEF laboratory of SERMA Technologies. It offers expertise, evaluation, consultancy and training to its clients, covering

hardware, software and information systems security. It is an SME that has more than 100 employees, an annual revenue of about 10 M€, and is present in five sites: Pessac, Paris, Rennes, Angers and Toulouse. It is currently organized into three business units:

- ITSEF—one of only five hardware and embedded system security laboratories approved by the ANSSI, created in 1998 and equipped with materials to conduct attacks on secure components and systems.

- Security consulting organized into four teams:

- Audit,

- Governance,

- HardSploit,

- Training.

- Safety—specialized in risk management in critical systems.

1.2. HardSploit team

This is a small R&D team working on the HardSploit tool. Currently, it is made up of six people, including myself:

- The team leader—a hardware security consultant also part of the audit team, who is acting as a client for the tool and offering his team members field expertise while taking care of the managerial aspects

- A PhD student, who is working on the embedded software of the FPGA and will use the tool in his research on building an AI-based intrusion detecting system for the CAN electronic bus

- An apprentice, who was working on the tool for three years and specializes in embedded software development

- An intern who is also working together with me on the second version of the software for his final year internship
- A second intern who is improving the first version for his summer internship.

Some members of the other teams of the BU also contribute to the project when they are between contracts.

1.3. Audit team

A team of ten people distributed in three cities: Rennes, Paris and Toulouse, with half of the team based in Rennes, traveling to their clients' cities if needed.

They provide services in five security domains:

- Infrastructures and networks
- Web and cloud
- Software applications
- Hardware
- Embedded software and reverse engineering I joined this team in the second part of my internship as I will explain below.

1.4. Work environment

SERMA Group is by no means a small company; it is made up of several teams of varying sizes that each have their own culture, but still profit from belonging to a big group. This can be clearly seen in the security consulting BU, which is made up of fewer than 20 employees, of which only 11 are based in Rennes. These employees developed an internal startup culture and benefit from some of its advantages—mainly a lack of a dress code, multiple short formal and informal meetings, flexible working times, free coffee, the occasional meals at nearby restaurants, etc. This sort of

advantage is also beneficial to the company, since it resulted in the consultants working longer duration than they are supposed to. They also occasionally organize internal training sessions prepared by one of the consultants, or after-work capture the flag competitions, where they all try to gain access to a vulnerable virtual machine. These activities result in learning experiences that directly impact their performance.

Objectives

What are the main contributions expected from the intern about employment trial program?

Each company should create their expectations from interns such as answering the questions of;

- Which specific IT field?
- What the intern will do?
- What subjects will be studied by the intern?

For Cybersecurity Example:

Based on company X's plans, the intern will work on the field of security, specially to cyber security. Thereby, we have determined the security laboratory, in fact, main services and research and development plan.

The intern will do and under which subjects;

- Attending company meetings,
- Meeting with already existing or potential clients,
- Engaging in discussions to identify the challenges regarding cyber insurance, as well as processed slide-show presentations within main intention to demonstrate company technical skills, for example: incident handling process, pen-testing, digital forensics, etc.
- Studying of current available solutions respectfully to cyber security, cyber insurance, risk assessment, data breaches, security in cloud, and many others. And oversee imposture to design and develop cornerstone approach relying on research exposure and lessons learnt.
- Dedicating research task to design and build security architecture for iWE SaaS platform by carrying out end-to-end data at REST, zeroknowledge encryption solution for cloud based client-side and server-side architecture.

Another example;

Based on company Z's plans, the intern will;

- Participate in the development/deployment of computer networks with a overall "security" in mind.
- Integrate and administer a network regarding switches, routers, firewalls, and network security appliance management.
- Respond and remediate security alerts regarding the network. Identify, implement, review, create, and define requirements for information security.
- Notify and alert other teams when system alerts have appeared.
- Reduce and remediate the efforts in false positives.

Employment Trial Program Course Contents

Each company can create a short description of the courses they they will provide for interns during the employment trial program. In that, there should be clearly outlined course descriptions, prerequisites (prior knowledge required), course modules to describe the names and basics of the modules, any other relevant information. This will help the interns to see overall course content, be prepared and examine if the course will serve for the interns' career plans.

For cybersecurity example, a course content should look like;

Module1: Introduction to Ethical Hacking-

Introduction

Need of Information Security

Phases Of Hacking

Understanding Penetration Testing

Understand Scope and limitations of Ethical Hacking

Cyber Crimes and Laws

Module 2: Networking Basics & Web Applications-

Introduction

What is IP Address and Subnetting, Tracing & Spoofing

LAN, WAN AND MAN

Web Application Working Mechanism

TCP & OSI Model

Virtual Private Networks Working Mechanism

Module3: Virtual Private Network-

What is VPN

How to Hide Identity by VPN

Pro and Free VPN Tools

Advantage and Disadvantage of VPN

Countermeasures

Module4: Email Hacking and Social Engineering-

Trace someone IP Address

Email hacking & Security

Social Networking Accounts Hacking

Fake Emails

Tab Nabbing Attack

Email and Fake Profile Tracing

Module5: Network Hacking-

Man In the middle Attack using ARP Replay Attack

Ettercap and Cain & Abel

Module6: Web Application Hacking-

Web Application Working Mechanism

XSS Attack

Email & SMS Flooding using Web Application Hacking

Owasp Top 10

Website Defacement By using Web Vulnerabilities

Web Application Security Techniques

Web Vulnerability Scanners

Module7: SQL Injection-

Introduction to SQL Injection

Admin Login Authentication Bypass

Union Sql Injection

Postgre SQL Injection

Mod_Security Bypassing

Complete Database Dump By SQL Injection

SQL Injection In POST Method

Tools For SQL Injection

Employment Trial Program Course Curriculum Design

This part is about showing companies how a course curriculum might look like, which can be provided under employment trial program. In that, we will use the case of cybersecurity as part of IT, which can give an overall idea to companies. Any company can produce or use their existing course curriculum in a similar way.

Also, any course curriculum's size will depend on the length of the course, the number of hours provided and scope. Therefore, companies would decide on such components based on their individual needs.

In our case, we will introduce some course curriculums (as examples) which can be adopted to different hours of training based on needs.

Example of Software Security Course Curriculum

The Software Security knowledge area focuses on the development and use of software that reliably preserves the security properties of the information and systems it protects. The security of a system, and of the data it stores and manages, depends in large part on the security of its software.

The security of software depends on how well the requirements match the needs that the software is to address, how well the software is designed, implemented, tested, and deployed and maintained. The documentation is critical for everyone to understand these considerations, and ethical considerations arise throughout the creation, deployment, use, and retirement of software. The Software Security knowledge area addresses these security issues. The knowledge units within this knowledge area are comprised of fundamental principles and practices.

Knowledge Units and Topics

The following table lists the principles essentials, knowledge units, and topics of the Software Security knowledge area.

SOFTWARE SECURITY		
Essentials - Fundamental design principles including least privilege, open design, and abstraction, - Security requirements and their role in design, - Implementation issues, - Static and dynamic testing, - Configuring and patching, and - Ethics, especially in development, testing and vulnerability disclosure.		
Knowledge Units	Topics	Description/Curricular Guidance
Fundamental Principles		This knowledge unit introduces the principles that underlie both design and implementation. The first five are restrictiveness principles, the next three are simplicity principles, and the rest are methodology principles.
	Least privilege	Software should be given only those privileges that it needs

		to complete its task.
	Fail-safe defaults	The initial state should be to deny access unless access is explicitly required. Then, unless software is given explicit access to an object, it should be denied access to that object and the protection state of the system should remain unchanged.
	Complete mediation	Software should validate every access to objects to ensure that the access is allowed.
	Separation	Software should not grant access to a resource, or take a security-relevant action, based on a single condition.
	Minimize trust	Software should check all inputs and the results of all security-relevant actions.
	Minimize common mechanism	The sharing of resources should be reduced as much as possible.
	Least astonishment	Security features of software, and security mechanisms it implements, should be designed so that their operation is as logical and simple as possible.
	Open design	Security of software, and of what that software provides, should not depend on the secrecy of its design or implementation.
	Layering	Organize software in layers so that modules at a given layer interact only with modules in the layers immediately above and below it. This allows you to test the software one layer at a time, using either topdown or bottom-up techniques, and reduces the access points, enforcing the principle of separation.
	Modularity	Design and implement the software as a collection of co-operating components (modules); indeed, each module interface is an abstraction
	Design for iteration	Plan the design in such a way that it can be changed, if needed. This minimizes the effects with respect to the security of changing the design if the specifications do not match an environment that the software is used in.
Design		This knowledge unit describes techniques for including security considerations throughout the design of software.
	Derivation of security requirements	Beginning with business, mission, or other objectives, determine what security requirements are necessary to succeed. These may also be derived, or changed, as the software evolves
	Specification of security requirements	Translate the security requirements into a form that can be used (formal specification, informal specifications, specifications for testing).
	Software development lifecycle/Security development	Include the following examples: waterfall model, agile development and security.

	lifecycle	
	Programming languages and type-safe languages	Discuss the problems that programming languages introduce, what type-safety does, and why it is important.
Implementation		This knowledge unit describes techniques for including security considerations throughout the implementation of software.
	Validating input and checking its representation	For this topic: ● Check bounds of buffers and values of integers to be sure they are in range, and ● Check inputs to make sure they are what is expected and will be processed/interpreted correctly.
	Using APIs correctly	For this topic: ● Ensure parameters and environments are validated and controlled so that the API enforces the security policy properly, and ● Check the results of using the API for problems.
	Using security features	For this topic: ● Use cryptographic randomness, and ● Properly restrict process privileges.
	Checking time and state relationships	For this topic: ● Check that the file acted upon is the one for which the relevant attributes are checked, and ● Check that processes run.
	Handling exceptions and errors properly	For this topic: ● Block or queue signals during signal processing, if necessary, and ● Determine what information should be given to the user, balancing usability with any need to hide some information, and how and to whom to report that information.
	Programming robustly	This topic is sometimes called secure or defensive programming. Curricular content should include: ● Only deallocate allocated memory, ● Initialize variables before use, and ● Don't rely on undefined behavior.
Analysis and Testing		This knowledge unit introduces testing considerations for validating that the software meets stated (and unstated) security requirements and specifications. Unstated requirements include those related to robustness in general.
	Static and dynamic analysis	This topic describes the different methods for each of these, includes how static and dynamic analysis work together, and the limits and benefits of each, as well as how to perform these types of analyses on very large software systems
	Unit testing	This topic describes how to test component parts of the software, like modules.
	Integration testing	This topic describes how to test the software components as they are integrated
	Software testing	This topic describes how to test the software as a whole, and place unit and integration testing in a proper framework.

Knowledge Units	Topics	Description/Curricular Guidance
Deployment and Maintenance		This knowledge unit discusses security considerations in the use of software, and in its deployment, maintenance, and removal.
	Configuring	This topic covers how to set up the software system to make it function correctly.
	Patching and the vulnerability lifecycle	This topic includes managing vulnerability reports, fixing the vulnerabilities, testing the patch and patch distribution lifecycle
	DevOps	This topic combines development and operation, and the automation and monitoring of both.
Documentation		This knowledge unit describes how to introduce and include information about security considerations in configuration, use, and other aspects of using the software and maintaining it (including modifying it when needed).
	Installation documents	This topic includes installation and configuration documentation.
	User guides and manuals	This topic includes tutorials and cheat sheets (brief guides); these should emphasize any potential security problems the users can cause.
	Assurance documentation	This topic focuses on how correctness was established, and what correctness means here.
	Security documentation	This topic focuses on potential security problems, how to avoid them, and if they occur, what the effects might be and how to deal with them.

Essentials and Learning Outcomes

Interns are required to demonstrate proficiency in each of the essential concepts through achievement of the learning outcomes. Typically, the learning outcomes lie within the understanding and applying levels in the Bloom's Revised Taxonomy (<http://ccecc.acm.org/assessment/blooms>).

In this report, we provide the example of Software Security essentials and learning outcomes as an example as follows.

Essentials	Learning outcomes
Fundamental Design Principles; Least Privilege, Open Design, and Abstraction	
	Discuss the implications of relying on open design or the secrecy of design for security
	List the three principles of security.
	Describe why each principle is important to security.
	Identify the needed design principle.
Security requirements and the roles they play in design	
	Explain why security requirements are important.
	Identify common attack vectors.
	Describe the importance of writing secure and robust programs.
	Describe the concept of privacy including personally identifiable information.
Implementation issues	
	Explain why input validation and data sanitization are necessary.
	Explain the difference between pseudorandom numbers and random numbers.
	Differentiate between secure coding and patching and explain the advantage of using secure coding techniques.
	Describe a buffer overflow and why it is a potential security problem
Static, dynamic analysis	
	Explain the difference between static and dynamic analysis.
	Discuss a problem that static analysis cannot reveal.
	Discuss a problem that dynamic analysis cannot reveal.
Configuring, patching	
	Discuss the need to update software to fix security vulnerabilities.
	Explain the need to test software after an update but before the patch is distributed.
	Explain the importance of correctly configuring software.
Ethics, especially in development, testing, and	

vulnerability disclosure	
	Explain the concept that because you can do it, it doesn't mean you should do it.
	Discuss the ethical issues in disclosing vulnerabilities
	Discuss the ethics of thorough testing, especially corner cases.
	Identify the ethical effects and impacts of design decisions.

Course textbooks and materials

Provide a brief description of materials used (e.g., textbooks, programming languages, learning materials, online tools, online programs, environments, etc.) which can be sensitive materials such as using company software, passwords, access to sensitive data, being able to change company data, work on specific tasks etc. Each company should state such materials in the internship program beforehand.

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