Curriculum

Version 13.05.2022 (English)

I. Introduction and overview

The program in computer engineering is run by the [University of Notre Dame at Tantur](#) (UNDT) which is part of [Notre Dame International (NDI)](#). The program follows the standards for certificate (no degree) programs of the University of Notre Dame.

The 2-year program allows program participants to acquire the skills needed to become (full-stack) developers. The program runs in English and includes modules in Hebrew as a foreign language, soft skill development (e.g. CV writing, preparation for job interviews) and select modules in humanities (e.g. literature, philosophy). At graduation, participants will earn a certificate of completion from UNDT.

At the core of the program is the collaboration with the industry. UNDT invites companies to support participants financially, offer participants job prospects at graduation as well as workshops, hackathons and other mentoring capacities throughout the program.

Duration

- The programs lasts two years, within the format of five full days (approximately 40 hours) a week, on the campus of UNDT, Jerusalem
- The program duration is divided into 4 sections, each section lasting 6 months.

Curriculum blocks

The program is structured along three main curriculum blocks:

1. **Core (full-stack) curriculum** (ca. 80%, at least 38 hours a week on average): The core curriculum is based on the 01 EDU Systems software and is enhanced through additional "summer modules" that are offered by instructors from Notre Dame
2. **Hebrew language** (ca. 15%, 6 hours a week on average): The Hebrew language program is based on a tailored curriculum that is developed for Arab speakers, ensuring they master the language needed to enter and succeed in the local industry. Graduates will reach level 5
3. **Electives in soft skills and humanities** (ca. 5%, 2 hours a week on average): Additional (frontal) classes offered by Notre Dame faculty and/or other instructors to "round" the experience of the participants and help them grow personally and professionally.

The remainder of this document is structured along the 3 main building blocks of the curriculum.

II. Core (full-stack) curriculum

Description: The core curriculum is based on the 01 EDU Systems software (referred to herein as "the software" or the "teaching software"), and is run in a self-learning format and in a gamified atmosphere. It is enhanced through a block seminar with faculty and/or graduate students from the University of Notre Dame that will run once a year during the summer.

The teaching software guides the learner through the process. Besides introductory tools (smaller exercises and videos), learners are expected to work on different practical assignment (projects) that are based on real-word problem and test cases. By completing the assignments, the learners "move up" the levels of the gamified software. Program participants will learn both independently and in groups.

The learners will be accompanied by mentors – programmers with experience in the high-tech industry, who will be available to help them work together as a team and find creative solutions to complex problems. Once every 2-3 months, a partner company from the high-tech industry will run a "hackathon" which will allow the trainees to practice and experience real "case studies".

Main outcomes: Graduates will have the skill set of full stack developers. They will be able to deal creatively with a large variety of complex problems in the software engineering space, while developing creative collaborations with colleagues to problem-solve in teams.

More specifically, graduates will acquire the following skills:
- Excellent programming in the languages Go, Javascript, Rust and many other languages
- Knowledge of imperative programming, Unix, information security, data analysis and storage, functional programming, graphics, parallel processing, system management, network management, and object-oriented programming (OOP)
- Development of the skills organization, parallel processing, flexibility and creativity, technological integration, collaborative work (Collaboration)
- Very good familiarity with the fields of artificial intelligence, development and design of computer games, blockchain, cyber security, DevOps, application and mobile development

High Level Schedule (Core Curriculum)

Stage	Contents	Study hours	Capabilities
Section 1 Stages 0-5	Mastery of the basics of imperative programming Development and structuring of algorithms Basic network and telecommunications infrastructure Application development in GO language	One year (1050 hours) – 2 sections	Front end-back end
Section 1 Stages 6-10	Mastery of Intermediate level imperative programming Development and structuring of algorithms of medium complexity First level network and telecommunication infrastructure Application development in "Go" language		
Section 2 Stages 11-15	Object and functional programming at a basic level Advanced level imperative programming Mastery of network infrastructure technologies Mastery of Object Design, Algorithms, and Advanced Data Structuring Mastery of the "Go" language/ JavaScript Language/ Frameworks and Python language		Junior Full-stack developer
Section 3 Stages 16-21	System programming (RUST) elementary level Mastery of network architectures-optimization level	1 semester- 6 months	Full-stack developer Software designer and developer Analyst Mobile application developer DevOps
Section 4 Specialization	Specialization in one of the fields: Dominant Devop Dominant Algoritmie, AI, Blockchain, Application development domain Virtual reality, video games	1 semester- 6 months	

III. Hebrew language curriculum

Description: The courses in Hebrew are compulsory and are stratified according to level. Program participants are required to attend all five Hebrew courses during the 2- year program (ca. 6 hours a week on average each semester), i.e. 450 hours through the biennial program

The students will be divided into groups of 20-30 participants. During "practice classes" (about 50% of the time) each group will be divided into 2 so that the students can practice in small groups of maximum 15 participants.

The overarching goals of the Hebrew studies are to strengthen mastery of all language skills (reading comprehension, writing, listening comprehension, and speaking) as well as accommodate the program to the needs of the high-tech labor market, and to address cultural gaps, which often cause misunderstandings between employers and employees.

Main outcomes:

At the end of the biennial program, the graduates will be able to conduct conversations, participate in meetings, express their opinions, and get along in most situations of everyday and professional life

More specifically, graduates will acquire the following skills:

- **Speech** - Conducting a fluent conversation in everyday and professional situations, using a vocabulary of about 2500-3000 words, and employing all simple sentence structures and the most common verb forms.
- **Writing**- Writing simple texts on familiar topics; writing a coherent reply to questions
- **listening** - understanding social and professional conversations and active participation in meetings based on this comprehension
- **Reading** - comprehension of social and professional business correspondence as well as understanding the main points and issues in short articles on familiar topics.

High-Level Schedule Hebrew Language Curriculum

Name of course	Knowledge and skills	Study hours
Level 1- Basic level	Daily communication in basic life situations (such as: basic informal conversation, buying and selling simulations, simple instructions/ requests, ordering food and beverages, using initial and everyday vocabulary	22 weeks 135 hours
Level 2- Beginner level	Conducting a discussion on the following topics: food, clothing, home and daily routine, work routine (including responsibility and commitments). Dealing with easy tasks on the phone such as leaving a message or scheduling an appointment, requesting more information, and apologizing if necessary	22 weeks 135 hours
Level 3- "Intermediate" level	Conducting an informal conversation, responding to invitations and greetings, explaining and providing simple solutions, simulating a job interview, expressing agreement and objection at a basic level	22 weeks 135 hours
Level 4- Advanced level	Participation in a simple meeting, delivering and receiving information effectively, basic negotiation management, description of project needs, networking and promotion of professional interfaces	22 weeks 135 hours
Level 5- Professional level	Conducting official and informal conversations, expressing opinions, actively participating in meetings, engaging in daily and professional issues	22 weeks 135 hours

IV. Electives in soft skills and humanities

Description: Program participants are required to visit at least one elective module (ca. 2 hours a week on average) each section, i.e. 4 elective modules through the program, three of which have to be in humanities and 1 in soft skills development.

Electives are taught by a Notre Dame faculty or other instructors in smaller groups (up to 30 participants), and cover topics in humanities (e.g. introduction to Western Philosophy, Contemporary Literature etc.) and in soft skill development (e.g. CV writing).

Main outcomes: Elective modules in humanities aim to introduce participants to a variety of different topics in ethics, philosophy and arts, and thus to a variety of fields with terminologies and theories. At their core, these modules aim to arouse the interest in participants to continue exploring these fields independently. This is done through a sense of "academic humility" and the notion to challenge the ways of thinking, especially building, verifying and falsifying hypotheses.

Electives in soft skill development aim to give participant practical tools that will support them in searching, acquiring and succeeding in the job market.

Exemplary modules

Module	Contents	Study hours
"Introduction to Western Philosophy"	• Basic acquaintance with the great philosophers, texts, and central ideas of Western philosophy • Reading a selection of classical philosophical works • Development of free and complex thinking	6 months (ca. 36 hours)
"Contemporary Literature" - Book Club	• Experiential meetings, in which the participants read together works of Arab and international literature • Acquiring tools to analyze and discuss works of literature while considering the relevant cultural and historical background of the works	6 months (ca. 36 hours)
"Introduction to Philosophy in Islam"	• Basic acquaintance with the great philosophers, texts, and central ideas of philosophers who were raised in Islamic countries, including also non-Muslims (al-Ghazali, al-Farabi, Ibn Sina and more) • Reading a selection of classical philosophical works • Development of free and complex thinking	6 months (ca. 36 hours)
Resume writing	• Construction of a personal SWOT - a model for identifying and analyzing personal attributes and skills • Writing a professional resume designated to a specific job/position • Writing a cover letter applying for a position • Adapting the resume to different jobs and positions	6 months (ca. 36 hours)
"From a successful idea to a successful product" – the business planning of products	• What is business planning and why is it required? Discussion of the underlying concepts • Business plan structure (market analysis and accurate identification of barriers, opportunities and solutions) • Construction and correct/appropriate presentation of a business plan • Practice building a business plan for an actual product	6 months (ca. 36 hours)