IT Industry & Education in Wroclaw

Report from a study
October 2016

TABLE OF CONTENTS

INTRODUCTION

Polish IT market is, after Russia, the second largest in Central and Eastern Europe, and the IT sector one of the fastest growing sectors in Poland. According to IDG's estimates, the value of the Polish IT market at the end of 2014 amounted to more than PLN 34 billion. Currently approximately half a million people are working in the broadly defined IT industry, and in terms of the rate of increase in the number of jobs, it has been occupying the leading position for several years. IT experts are among the most sought-after professions in our country.

Wroclaw occupies a special place on the map of the Polish IT market, with one of the most developed and innovative IT ecosystems in the country. It employs more than 20,000 employees. This market is constantly expanding – both through international investments, as well as Polish companies, which have excellent conditions for development in the capital of Lower Silesia. Its needs in terms of access to highly qualified IT personnel are also growing.

This publication is the result of a survey conducted by HR consulting company HRK and the Wroclaw Agglomeration Development Agency in the 1st quarter of 2016 among Wroclaw IT companies and universities that offer computer science or related courses. Our goal was to identify the needs of employers in terms of access to competence and to check the degree in which the current offer of the universities answers these needs. The survey included 45 companies. In addition, representatives of selected companies participated in in-depth interviews, which allowed us to better understand the challenges faced by Wroclaw employers in terms of access to IT personnel and their expectations from universities. Based on the information received from employers, we have prepared a list of questions for the universities, focusing mainly on education programmes and forms of cooperation with business.

We hope that our project will provide you with information based on which it will be easier for employers to acquire IT professionals, and for universities – to create an informed education policy, tailored to the needs of the labour market, and for the authorities of Wroclaw – to plan promotional campaigns that will attract students if technical majors and experienced IT specialists to our city.

Authors

This publication is under the patronage of

Invest in Poland

POLISH INFORMATION AND FOREIGN INVESTMENT AGENCY

WROCLAW
– A FAVOURABLE CLIMATE FOR IT

The technological potential of Wroclaw in the field of electronics and information technology has been in development for over 50 years.
In 1963, manufacture of Odra computers started in Wroclaw, and three years later the Faculty of Electronics was created at the Wroclaw University of Technology. Until the nineties of the twentieth century, the capital of Lower Silesia was the only centre in Poland, where mass production of computers took place – at ELWRO.
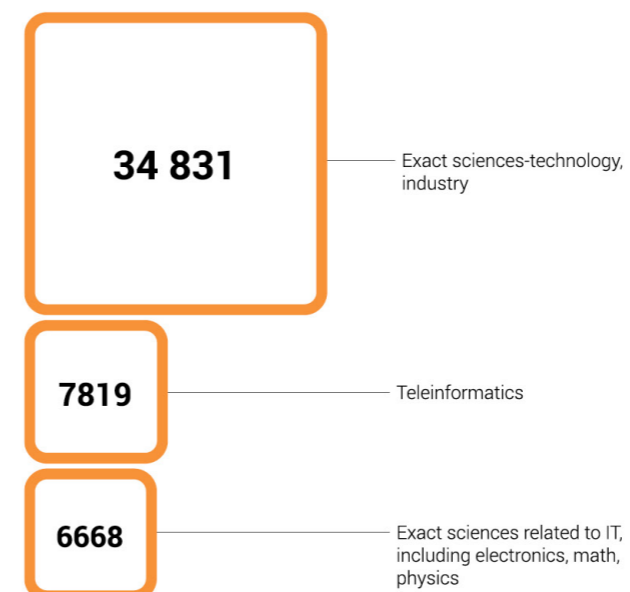
A new era in the development of the IT sector in Wroclaw began in 2000 with the decision by Siemens to create a software development centre here. Krzysztof Kuliński, the then director of Siemens and now Country Manager of GlobalLogic, recalls: *"In June 2000, notices appeared at the Wroclaw University of Technology about openings at the Wroclaw Siemens branch. They wanted to hire 20 people, after a week they got... 800 resumes"*.
Today, Wroclaw is a mature, thriving IT centre.

During the study, we identified about 200 IT companies and entities that have large IT departments in their structures. The city itself is also a major employer, employing more than 100 specialists in the integrated IT Services Centre. What contributed to such a big success in the IT industry?

1. Human and academic potential

Wroclaw has a population of over 635,000 people, and the population of the Wroclaw agglomeration is close to 1.2 million inhabitants. This makes the capital of Lower Silesia the fourth largest metropolitan area in Poland. At the same time, Wroclaw is the third largest academic centre in the country, and the Wroclaw University of Technology, together with the Warsaw University of Technology are the best technical universities in Poland. In 2015, 124,440 students were enrolled in 26 universities, which is nearly 20 percent of the city's population. Nine Wroclaw universities are currently educating students for the needs of the IT industry.

◼ SELECTED IT COMPANIES
AND COMPANIES FROM OTHER SECTORS WITH SIGNIFICANT IT ACTIVITIES LOCATED IN WROCLAW

Large companies (250+)
Atos, IBM, Nokia, Capgemini, Objectivity, Unit4, Global Logic, IBM, Luxoft, Sii, SMT Software, Hicron, Tieto.

Medium companies (50–250)
Acturis, Axit, Better Software Group, BLStream, Ceneo, Comarch, CSS Corp, DataArt, Diehl Controls, Divante, Dolby, Enabledware, Rinf, Espotel, Fingo, Gigaset, Grupa Unity, Imagination Technologies, Indata, Infor, InSert, IT Kontrakt, Livechat, Logitrans, Minetronics, Mphasis, NBC, Neurosoft, Ocado, Opera Software, PGS Software, Pilab, QAD, Redknee, RightHello, RST, Ryanair Labs, Sente, Silicon & Software Systems, SoftServe, Sygnity, Talex, Techland, Ten Square Games, Tequila Mobile, Tooploox, Transition Technologies, Viessman, Vulcan, Yuma.

Other IT companies
Accessto, Agile Force, All Mobile, Anixe, Appformation, Arkency, Astek Polska, Brand24, BrighOne, BTech, Callstack.io, CCA, Cogniance, Dook Pro, Droids on Roids, EARP, Empirica, Fast White Cat, Fream, Fun Media, Geosoft, GISPartner,Gorilla Group, Grinn, Huzar Infusion, Inteca, Intenso, ITMation, look4IT, Minetronics, Mirumee Software, Mobile Vikings, Mok Yok IT, Monterail, MT Silesia, Naturaily, Neurosys, Nomtek, Ocado, Picadilla, Quality TaskForce, RatioWeb, Red Embedded, Red Sky, Ringo Sagiton, Satlan, Sienn, Soflab, Sofomo, Software, Solsoft, Solutions, Stemedia, STX Next, Testuj.pl, Trapeze Poland, Vratis, Wilabs, Zone IT.

Companies from other sectors with significant IT activity, located in Wroclaw
3M, AB, BZ WBK / Santander, Catlin XL, Credit Agricole, Credit Suisse, Eurobank, Europejski Fundusz Leasingowy, EY, Getin Noble Bank, Impel, Kaufland, KRD Economic Information Bureau, Kruk, Netia, PPG, Qiagen, Synexus, TelForce One, UBS, Ultimo, Volvo IT.

Students enrolled in science majors in Wrocław

|	
34 831	Exact sciences-technology, industry
7819	Teleinformatics
6668	Exact sciences related to IT, including electronics, math, physics

Source: CSO, as at the end of 2015

2. Foreign investments in the IT industry

A significant part of the companies operating in Wroclaw are companies with foreign capital. Their share is even greater when it comes to the total number of people employed in the industry. The first foreign projects in the area of IT in Wroclaw were investments made by Siemens (now Nokia), Capgemini and Volvo, which proved to be very successful. These companies very quickly reached the employment of hundreds of people. Thanks to the jobs created by foreign investors, there was no outflow of IT professionals from Wroclaw to other centres in the country and abroad, cooperation with universities has developed and interest in IT studying in Wroclaw has increased. Investments made by renown brands have also built the city's reputation in the industry and contributed to the influx of new investors. Currently, the city has dozens of foreign IT companies with different profiles, many of them carrying out R&D projects related to the development of innovative software, which builds the image of Wroclaw as a strong IT centre in the country and in Europe and is a magnet for IT professionals, graduates and students from other centres.
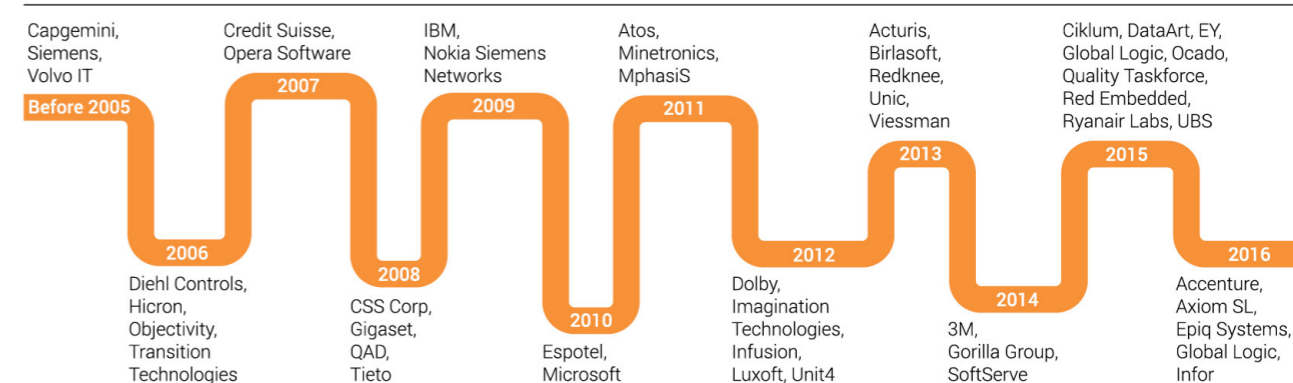
3. Formation and dynamic development of Wroclaw IT companies

In parallel with the influx of first significant foreign projects began, local companies with Polish capital began to develop rapidly in Wroclaw. After a slowdown in 2009-2011 due to the global financial crisis, this process has accelerated significantly. Both during the first and second decade of the twenty-first century, a number of companies were established in Wroclaw that have achieved significant business success.

Selected IT companies, which were created or launched major operations in Wroclaw

2001-2010	SMT Software, Hicron, PGS Software, REC Global, Fingo, Sente, Techland, LiveChat
After 2011	Ten Square Games, ToopLoox, Droids On Roids, Brand24, PiLab, Monterail, Mirumee, Appformation

IT companies created during the first of the above periods mostly based their business model on software manufacturing, or services for third parties. Some of them reached a large enough size that in order to secure further development they decided to issue shares (PGS Software and LiveChat), entry into the structures of global corporations (REC Global and Global Logic) or to sell the company to a strategic investor, which plans to create a Polish leader in the market of services in the field of software manufacturing (SMT software). It is also worth to mention Techland, the producer of computer games with its head development office in Wroclaw, which in 2015 became one of the world's leading producers thanks to the global success of Dead Island and Dying Light. The companies created in recent years are equally interesting. In 2015, Droids on Roids was placed among the Top 5 Rising Stars in Deloitte Technology Fast 50 Central Europe Awards. DataWalk – an advanced platform for searching and analysing big data created by PiLab was recognised as one of the most innovative products by the MIT Technology Review. Let's Fish developed by Ten Square Games is currently the most popular online game of this type in the world with over 30 million active users. It is also worth mentioning Appformation, founded and directed by Magdalena Mazur-Milewska, which provides customers with comprehensive mobile and web applications, from the sketch, to the design, implementation and back-end.

Major foreign investments in the IT sector in Wrocław in subsequent years

Before 2005 — Capgemini, Siemens, Volvo IT

2006 — Diehl Controls, Hicron, Objectivity, Transition Technologies

2007 — Credit Suisse, Opera Software

2008 — CSS Corp, Gigaset, QAD, Tieto

2009 — IBM, Nokia Siemens Networks

2010 — Espotel, Microsoft

2011 — Atos, Minetronics, MphasiS

2012 — Dolby, Imagination Technologies, Infusion, Luxoft, Unit4

2013 — Acturis, Birlasoft, Redknee, Unic, Viessman

2014 — 3M, Gorilla Group, SoftServe

2015 — Ciklum, DataArt, EY, Global Logic, Ocado, Quality Taskforce, Red Embedded, Ryanair Labs, UBS

2016 — Accenture, Axiom SL, Epiq Systems, Global Logic, Infor

SUCCESS STORY: GLOBALLOGIC POLSKA

2007
- Krzysztof Kuliński, the creator of the success of Siemens SDC (Software Development Center) in Wroclaw creates a Polish company Research and Engineering Center (REC).

2008
- Implementation of first projects.
- Specialisation in the field of embedded systems, process improvement.
- Establishment of a R&D centre in Koszalin.
- Opening REC offices in Zilina, Munich and London.

2009
- Zilina becomes REC's R&D centre.
- Another foreign R&D centre is created in Zagreb.
- Diversification of activities.
- Acquisition of Cinterion.
- Very good financial results despite the crisis and the loss of one of the larger contracts.

2010-2013
- REC doubles employment and revenues.
- Opening subsequent R&D centres in Zielona Gora and Banska Bystrica (Slovakia).
- Development consistent with the strategy of diversification - new industries and technologies are introduced into the offer.
- Opening a sales office in the United States.
- In 2013, REC confirms its international character by changing the name and logo to REC Global.

2014-2015
- Opening of another R&D branch in Szczecin, which in a few months employs 50 people.
- Discussions among the management about the company's future – diversification or specialisation? Independent operation or in cooperation with a partner?

2016
- Entry into the structures of GlobalLogic – a global giant in the field of software engineering with extensive experience in digital transformation projects – new perspectives and unlimited opportunities.
- GlobalLogic in Poland becomes the company's European headquarters.
- The company structures are expanded to Krakow.

2017-2018
- Plans for doubling the employment.

Find out more about GlobalLogic Polska on
www.globallogic.com

Krzysztof Kuliński
SVP, Country Manager Poland, Croatia

"When you're building such a large company like GlobalLogic Polska from the ground up, the most important are the vision and imagination. My dream has always been to have my own, vibrant company in the field of software engineering that will successfully operate in the global market and deliver software for the largest manufacturers in the world. I have been fulfilling my dream together with a group of friends for many years. In our daily work, what counts is consequence and people – trusted, committed and convinced of the success of the company. And of course you cannot forget about the clients, you have to look for proven and reliable customers of our services, and this is possible thanks to a well-developed networking".

4. Diverse and growing economy

For more than two decades, Wroclaw and the Lower Silesia region have been among the top locations in Poland in terms of attracting foreign investment. At that time, there was a significant influx of projects in the manufacturing sector, which contributed significantly to maintaining and developing the economic potential of the city. In subsequent years, manufacturing companies, which were initially mostly guided by the favourable geographical location and low lobour costs, have begun to invest in the region, as well as in more and more advanced manufacturing technology, research and development centres, as well as shared services centres, including IT.

Since 2005, when Poland joined the European Union, there has been an influx of investments related to the SSC/BPO sector, and influx of IT projects has also intensified. The modern services sector itself has created 30,000 to 35,000 jobs in Wroclaw, according to current estimates, which places the city on the third position in Poland, behind Krakow and Warsaw. According to a cautious breakdown, presented by the Polish Agency for Information and Foreign Investment in the publication "Business Services Sector in Poland. Gaining Momentum" from 2016, the structure of the sector is as follows:

IT Centres **9,500**

SSC **8,700**

BPO **6,400**

R&D **5,600**
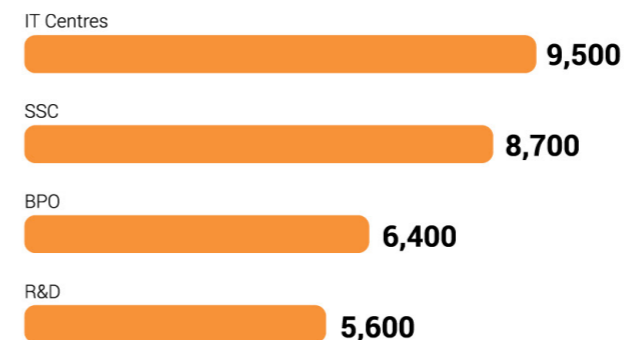
Over 80% of companies in the R&D subgroup are IT companies. The report does not include Polish small and medium-sized companies and a significant number of mojor IT departments in companies outside the SSC sector (e.g. BZW BK, Credit Agricole, PPG).

5. Pro-business and innovative economic strategy of local authorities

For many years, Wroclaw has enjoyed a reputation of one of the most friendly centres in Poland to foreign investors and a city, which is conducive to business development. This is confirmed by economic data and rankings, including those relating to investment attractiveness.
- Actual GDP growth in Wroclaw in the years 2004–2012 was 45% (second place in Poland after Warsaw).
- The unemployment rate in Wroclaw in the years 2004–2014 decreased from 12.3% to 4.3% (currently 3.3%), which was the largest decline among 12 metropolitan centres in Poland.

- In the global ranking Tholons, assessing the best locations for the outsourcing sector, Wroclaw currently occupies 58th place (in 2015 it occupied the 62nd place and in 2014 – 65th).
- In the ranking prepared by FDI MAGAZINE – European Cities and Regions of the Future 2016/2017, Wroclaw won in the FDI Strategy category and took third place in the Business Friendliness (Mid-Sized Cities) category.

The approach of the city authorities to innovation and business are best reflected in the statement made by Rafal Dutkiewicz, the Mayor of Wroclaw, during the inauguration of the Startup Wroclaw conference, organised by ARAW in May 2016: *"Ten years ago, we faced the challenge of creating new jobs and we did it, because the unemployment rate fell from more than 10 percent in Wroclaw to 3 percent. Today, it seems important to create better jobs through innovation, research and implementation of inventions, because the economy has ceased to be an exchange of goods, and has become the exchange of ideas".*

The city is also now a national leader when it comes to implementing educational initiatives aimed at training personnel for the IT sector and the popularisation of IT.

SELECTED EDUCATIONAL INITIATIVES

The **code::dive** conference is an event organised in 2014 with the support of the Wroclaw branch of Nokia. Each year, it brings together over 1000 participants, who during 40 sessions have a chance to meet with 35 renown speakers. In addition to issues related to programming in C, C ++ and D, issues relating to the latest technologies are analysed, such as BigData, IT Clouds or the Internet of Things.

The first **Boiling Frogs** Software Craftsmanship was held in January 2016 at the initiative of the Wroclaw IT Corner association, intended for IT specialist, web developers, software architects and students of technical science. Participants receive a versatile range of knowledge and skills that are useful for any programmer. The purpose of the event is to create a place for discussion and exchange of experiences related to the use of different tools and paradigms that can be an inspiration in everyday work.

WROC#
DEVELOP YOURSELF

Thanks to the company Objectivity, since 2015, four hundred .NET platform enthusiasts have had the opportunity to meet with well-known experts in this field and hear the series of six 60-minute lectures at the Municipal Stadium in Wroclaw, as part of the **WROC#** conference. The main task of the conference is to bring together world experts to discuss issues close to the heart of every .NET developer.

MY FUTURE IN TECHNOLOGY

This is a joint initiative of the city of Wroclaw and leading IT companies. The main objective of the project is to introduce modern business and practical aspects of technology to Wroclaw schools and provide students, teachers and parents with practical knowledge of the IT industry as well as to promote exact sciences and develop programming skills.

1,500 students in meetings with companies throughout the school year

64 teams taking part in competitions

7 leading IT companies involved in the project – Nokia, Capgemini, Objectivity, Gigaset, Espotel, Techland and QAD.

WROCŁAW does IT

The goals of the initiative, directed mainly to students of exact sciences, is for the largets IT companies in Wroclaw to share the ins and outs as well as interesting facts about the industry. After each lecture, the companies organise workshops where participants can put the acquired knowledge into practice.

2 editions

7 leading IT companies involved in the project: Nokia, IBM, VOLVO, UBS, Credit Suisse, Capgemini, Global Logic

15 lectures and workshops for students, organised within a month.
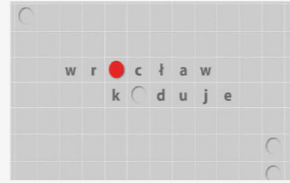
The project is coordinated by Wroclaw Academic Hub, which consists of two subprojects: Language of the Machines and Wroclaw Works:

Language of the Machines
The aim of the project is to promote the art of programming, as well as algorithmic and logical thinking from an early age. In October 2013, 60 Wroclaw primary schools started teaching a new subject – the language of machines. This is the response of the city to the huge demand for programmers. As part of the classes, Wroclaw primary school pupils have the opportunity to learn the secrets of programming.
Basic programming is taught through play and tasks that teach problem-solving. As part of the project, a group of 130 teachers has been trained - not only teachers of exact sciences, but also teachers of history, music and foreign languages.

Wroclaw Works
The project is aimed at people who are unemployed or who want to change their current occupation, interested in technology and computer science, but not necessarily holding a degree in computer science. The organisers promote the idea that people with different backgrounds can learn programming languages and find employment in IT companies. Teaching methods have been prepared in consultation and in accordance with the needs of the fastest growing companies operating in Wroclaw (NOKIA, Tieta, Credit Suisse, Volvo IT, SMT Software, Atos IT Services).

■ OTHER REGULAR TECHNOLOGY-RELATED EVENTS IN WROCLAW

SQL Day
SQL Day is an annual conference organised by the Polish SQL Server User Group - an association that hosts monthly meetings for several hundred data enthusiasts in 8 Polish cities. SQLDay is also the biggest conference in this part of Europe dedicated entirely to the Microsoft data platform.

LiveChat Hackathon
The goal of the hackathon is to reveal the hidden potential in the communications platforms and encourage the creation of new solutions that can change the face of communication.

GeekGirlsCarrots
Geek Girls Carrots is a global organisation focused on connecting, learning and inspiring women in Tech and IT. We create community by organising meeting, workshops, and other events which gather people to share their knowledge and experience.

Wroclaw .NET User Group
Wroclaw .Net User Group is an initiative of enthusiasts of .NET technology from Wroclaw and the surrounding areas. The group's objective is to deepen the participant's personal development through the exchange of experiences, gaining new knowledge and strengthening the existing knowledge related to Microsoft technologies.

Meet.mobile Wroclaw
Mobile Developers Group in Wroclaw. We focus on: mobile development, new trends, Android, iOS, Windows Phone

BrainCode
A 24-hour hackathon held in five cities simultaneously. It is addressed to both novices and professionals.

Social Media Thursdays
Social Media Thursday is a meeting of people involved with the social media industry on a daily basis or in their spare time. The casual atmosphere of the meetings is conducive to building new relationships, sharing knowledge and fun.

Wroclaw JUG Meetup (JAVA)
An open event for anyone interested in Java

Agile Wroclaw
Meetings of the Wroclaw community of practitioners and enthusiasts of agile software development methods.

---

6. High quality of life
Wroclaw is among the leading Polish cities in terms of transport investments (airport, motorway ring road, train station, tram network), investments improving the quality of life (upgrade of water treatment plants and wastewater treatment plants, restoration of historic tenements, regeneration programmes, expansion of schools) and investments making the city more attractive in terms of entertainment and culture (Municipal Stadium, Africarium, water park, National Forum of Music). The attractiveness of the city is increased by the organisation of international events such as the European Capital of Culture 2016 or the World Games 2017.

To summarise the advantages of the city, let us quote the response of one of the users on the Quora:

As a foreigner, what is the best city in Poland to live in?

I would suggest Wroclaw because it's a nice city, there are many young people, and you'll live a pleasant daily life with a lot to do.

To begin, I am not from Wroclaw. I'm from a suburb of Rzeszów, which is in the southeast of Poland. There's not as much to do there, unfortunately, for foreigners.

The job opportunities are actually pretty high right now. Currently, all of the Polish kids in the west are moving to Germany for jobs since the pay is higher and working conditions are a bit better. You'd find a job without a problem.

Wroclaw has some nice markets, coffee shops, libraries, and parks. I've only been once, when I was little, but I remember it being a ton of fun. I know you're not a tourist, but there are also some nice museums, architecture (the tallest building in Poland), and theaters that you may also enjoy.

If you decide to move to Wroclaw, it's within driving distance of many cities. It's only about 325 km (200 miles) from Prague, and even less from Kraków. If you wanted to go away for a weekend, you could easily go anywhere.

It's the fourth largest city in Poland, but also has some of the nicest people in the country. I genuinely think that you would enjoy yourself there.

Finally, if you're Western European/American, I would suggest it even more because there are some German influences on the city that will make you feel at home.

FROM THE PERSPECTIVE OF IT COMPANIES.
RESEARCH RESULTS

WROCLAW'S IT COMPANIES
– WHO ARE THEY, WHAT DO THEY DO?

Due to the extremely high dynamics in the IT industry, it is difficult to determine the exact number of IT companies operating in Wroclaw, and the number of their employees.

During the survey conducted in the 1st quarter of 2016, we identified more than 200 companies with different profiles and scale of operations, including companies with large IT divisions or departments. In the end, the online survey was filled out by 45 companies. Their characteristics says a lot about the structure of the IT market in the capital of Lower Silesia.

62 percent of the survey participants were organisations of Polish origin, but a 31 percent share of foreign companies confirms the high interest in Wroclaw from investors. They are mostly American (11 percent), Swiss (7 percent) and Finnish investors (4 percent). Other countries have been indicated by single respondents.

Among the companies surveyed, quite a number were large organisations with over 500-person teams (16 percent). The largest IT companies operating in Wroclaw, employing over 1000 people, accounted for 7 percent of the study participants (e.g. Nokia, Capgemini, Credit Suisse, IBM).

More than half of the IT companies surveyed are medium-sized organisations, employing 50 to 500 people. A significant number of small companies with fewer than 50 employees allso took part in our study (29 percent). The activity of these companies is becoming more and more visible in Wroclaw's IT market. It manifests itself both in the organisation of industry events, international expansion, as well as in the creation of professional organisations. The largest and most active entity built on their initiative is currently ITCorner, an association of small and medium-sized Polish IT companies, bringing together several dozen entities.

Przemysław Skrzek, CEO of ITCorner

"The emergence of the Wroclaw cluster ITCorner was a response to the needs of small and medium-sized businesses related to cooperation with public institutions, universities and with international cooperation. ITCorner was established in 2013, currently uniting nearly 50 member and partner companies in the area of IT (software, mobile applications, management systems and HR), communication and Internet marketing.

In total, we employ over 700 people in Wroclaw. For 3 years we have been working closely with the Wroclaw University of Technology by organising an internship programme
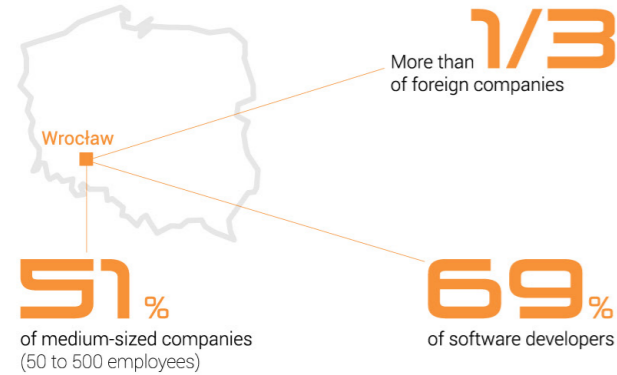
ITPopCorn (starting this year, we are also cooperating with the University of Wroclaw). In 2016 the Boiling Frogs Software Craftsmanship, the conference co-organized by ITCorner, started. We were able to invite hundreds of IT professionals and business owners from throughout Poland. This year we became involved as an association in cooperation with the Berlin SIBB cluster of new technologies (ICT & Digital Business Association Berlin-Brandenburg). Also, our members are undertaking greater cooperation with partners from Europe and around the world. Companies belonging to IT Corner are employing now about 1000 people".

Wroclaw is also one of the most important startup centres in Poland. Companies at the earliest stage of development were not included in the survey, but we must note the strong potential of the city in this regard, which is affected by a large number of universities, one of the highest levels of entrepreneurship in the country (third place in terms of the number of companies per 10,000 inhabitants) , availability of research and business infrastructure, and a wide range of services available to businesses. The profile of small IT companies in Wroclaw consist mainly of software, biotechnology and biochemistry, IoT and SmartCity.

Generally, the IT specialisation of Wroclaw is software manufacturing (69 percent of companies), it should be noted, however, that the vast majority of companies operating in Wroclaw produces software for external (B2B, end user) or internal customers. Less than half of organisations (44 percent) deals with services, implementation and IT consulting, and 1/3 – software sales. A large part of the IT Wroclaw scene consists of innovation companies involved in R&D (24 percent). Survey participants had the option to indicate several types of activity and many companies took advantage of this opportunity – usually simultaneously indicating

software manufacturing along with services/implementation/IT consulting. Only two organisations surveyed indicated IT outsourcing (SSC) as their main activity, but let's remember that companies engaged in similar activities tend to have multiple teams, and thus a significant impact on the labour market (this group includes Luxoft, Sii, IT Kontrakt, SMT Software and NBC).

Wrocław

More than **1/3** of foreign companies

51% of medium-sized companies (50 to 500 employees)

69% of software developers

Business profile (%)

Software – manufacturer **69**
Services / Implementation / IT Consulting **44**
Software – sales **33**
R&D **24**
Hardware – manufacturer **13**
Distributor / VAD (value added… **7**
Integrator / Vendor **7**
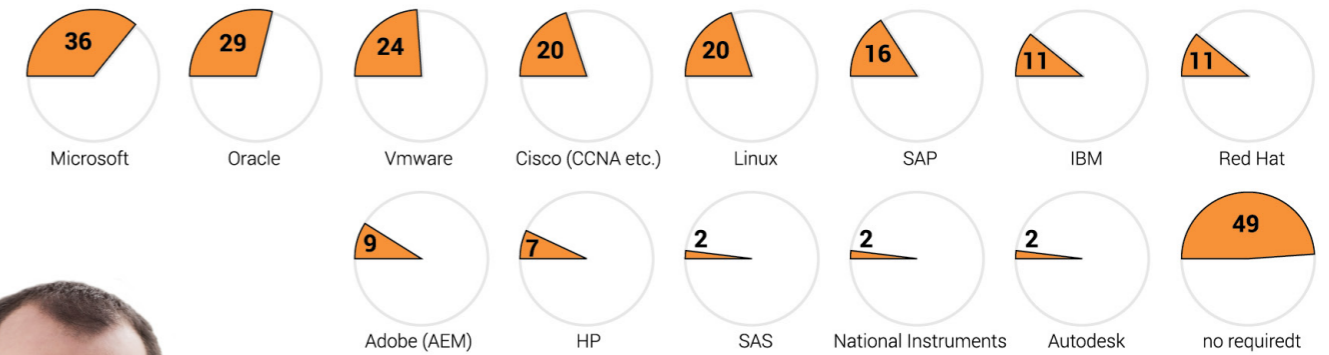Hardware – sales **7**
Shared Service Centre **4**

PROFILE OF THE SOUGHT CANDIDATE

The desired specialist competences

The most sought-after specialist competence in the area of IT in Wroclaw is programming, indicated by as many as 93 percent of the companies. Project management skills are also very sought-after, much less demand is observed in the area of analytics and testing. Among the competences sought, 60 percent of the companies indicated the knowledge of databases. These skills are particularly important in software manufacturing, which is a speciality of Wroclaw IT companies. Other skills received a slightly smaller number of indications – for example, several companies have chosen skills in the field of security, administration, modelling and virtualisation. During in-depth interviews accompanying the survey, industry representatives also indicated the areas of competence, where they are expecting an increasing demand of the market. These include mobile technologies, DevOps, data analysis, business analysis and UX.

The most desirable specialist competencies (%)

Programming **93**
Project management **82**
Analytics **71**
Testing **71**
Databases **60**
Security **38**
Administration **33**
Modelling **29**
Virtualisation **27**
Signal processing **11**

The desired certifications of software manufacturers

The HRK and ARAW survey shows that almost half of Wroclaw employers do not require candidates to hold certificate issued by software developers. The value of individual certificates varies from the point of view of employers. Only some of them have an impact on career opportunities and remuneration. However, obtaining a given certificate requires the participation in specific training, passing one or several tests and is associated with raising the level of knowledge and skills. Therefore, a large part of Wroclaw companies subsidise the certification process of their employees, and in some companies, this is a part of the employee motivation and retention policy.

Employers usually opt for Microsoft certification (36 percent), which offers different paths of development – in the area of servers, databases and application development. Less frequently they expect Oracle certificates for Java developers (29 percent). Certificates from VMware, which is the leader in the virtual infrastructure market (cloud solutions) occupy the third place. The 4th place is held – ex aequo – by Cisco certificates (CCNA and other certificates in the area of network technologies) and Linux (certificates in databases). Further down are SAP certificates (business applications), IBM certificates (system administration) and Red Hat certificates (several certification paths, including for data centre specialists, architects, virtualisation administrators and cloud solutions architects solutions). Other producers' certificates received less than 10 percent of indications.

The most desirable certifications of software manufacturers (%)

Microsoft **36**
Oracle **29**
Vmware **24**
Cisco (CCNA etc.) **20**
Linux **20**
SAP **16**
IBM **11**
Red Hat **11**
Adobe (AEM) **9**
HP **7**
SAS **2**
National Instruments **2**
Autodesk **2**
no requiredt **49**

Bartosz Ciepluch
Director of the Nokia Networks European Centre for Software and Engineering in Wroclaw

"Learning does not end with the receipt of a diploma, that's why at Nokia we attach great importance to the expansion of competences and development of our employees. There are many career paths in IT and they do not stop on the position of a manager.
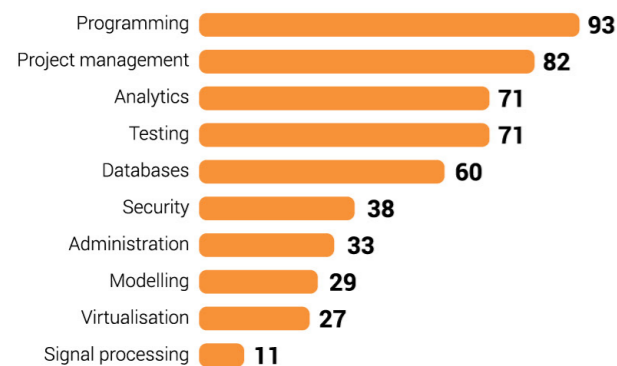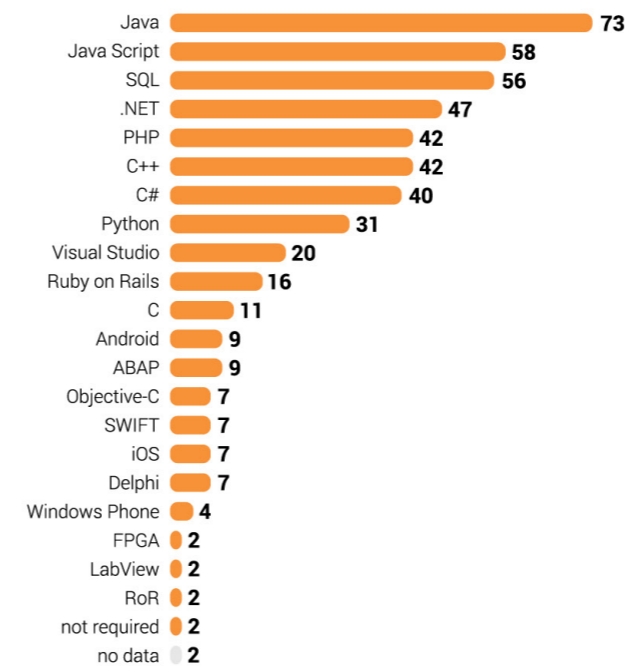
For example, a good programmer can become a specifier or a system architect. At the beginning everyone starts from the same level, but further development is already a personal matter of every employee".

The desired programming languages

The dominant programming language in Wroclaw is Java (indicated by 73 percent of companies). Developers with a good knowledge of the language are in the best position on the Wroclaw labour market. A little less popular are Java Script (indicated by 58 percent of companies) and SQL (56 percent of responses)– the language used for creating and modifying databases, etc. More than 40 percent of employers are looking for candidates with knowledge of .NET, PHP, and C#, and slightly more than 30 percent of employers - with the knowledge of Python. The share of Wroclaw companies using low-level programming languages such as C++ (42 percent of responses) and C (11 percent of responses) is relatively high. The number of companies specialising in mobile technologies has been increasing in recent years, but they are still a small part of the market.

The desired programming languages (%)

Java **73**
Java Script **58**
SQL **56**
.NET **47**
PHP **42**
C++ **42**
C# **40**
Python **31**
Visual Studio **20**
Ruby on Rails **16**
C **11**
Android **9**
ABAP **9**
Objective-C **7**
SWIFT **7**
iOS **7**
Delphi **7**
Windows Phone **4**
FPGA **2**
LabView **2**
RoR **2**
not required **2**
no data **2**

The desired certifications in administration / security

In the area of systems administration and security, the majority of Wroclaw employers (64 percent) do not require candidates to have any certificates. Others most commonly require ITIL/ITSM (24 percent), followed by CCNA – a certificate for Cisco administrators (16 percent).

The desired certifications in administration/security (%)

ITIL/IT SM **24**
CCNA (Cisco Certified Network Administrator) **16**
MCSA (Microsoft Certified Solutions Associate) **11**
CISM (Certified Information Security Manager) **11**
RHCA (Redhat Certified Administrator) **11**
CISSP (Certified Information Systems Security Professional) **9**
we do not require certification **64**
no data **2**

The desired certifications in project management

The specificity of Wroclaw IT market, which is largely based on the production of software for internal or external customers, causes that most companies use the project-based approach. Therefore certificates in the area of project management are more popular than those for developers or testers. They are required by 66 percent of the surveyed companies.
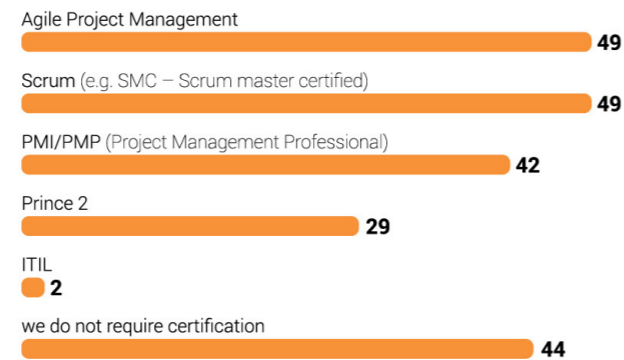So-called agile project management methods – Agile Project Management and Scrum, were indicated by 49 percent of employers. They are also the leading methodology for project management in the surveyed companies. Project Management Professional certificates from PMI were indicated by 42 percent of employers. Less popular is Prince 2, indicated by less than 30 percent of Wroclaw employers.
The approach of individual companies to the project management system in the company is varied and depends on the size of the organisation, the degree of its maturity, the specifics of clients or projects.
The largest organisations have extensive teams of project managers and PMO structures, some companies

implementing large outsourcing projects require certification from all PMs, while smaller companies are trying to implement agile methods as fully as possible, where the role of the project manager is less exposed. In Wroclaw, there is a very active community of project managers stimulated by different groups associated with industry organisations (PMI, IPMA), companies (Objectivity, Softserve) or groups of enthusiasts (Agile Wroclaw).

The desired certifications in project management (%)

Agile Project Management	49
Scrum (e.g. SMC – Scrum master certified)	49
PMI/PMP (Project Management Professional)	42
Prince 2	29
ITIL	2
we do not require certification	44

Paweł Łopatka
Board Member for Business Contracts, Project Management Institute Poland Chapter, Softserve - VP, Poland Country Manager

"Wroclaw is one of the most dynamically developing IT industry locations in Poland, with thousands of qualified and experienced project managers.
Wroclaw also has one of the most active branches of the Project Management Institute, which brings together project managers from the entire Wroclaw business environment. PMI Wroclaw is involved not
only in the organisation of seminars, workshops, training and conferences. It also makes it possible to build relationships that allow you to gain additional knowledge and expand the network of business contacts. Thanks to our volunteers, who come from many companies and business areas, we are able to deliver projects on an increasing scale".

The desired certifications in the field of modelling / analysis / testing

Slightly more than half of the companies do not require their employees to have certificates in the field of modelling/analysis/testing. The companies that do require it, usually indicate the International Software Testing Qualifications Board certificate. Other certificates are much less popular: UML was indicated by only 20 percent of employers, and International Institute of Business Analysis certificates by only 13 percent of responders.
In the field of modelling, experience is more important for employers than certificates. In turn, competences related to business analysis and data analysis, which are increasingly sought after by employers, are held by many people without a degree in computer science; they originate from business or other exact sciences.
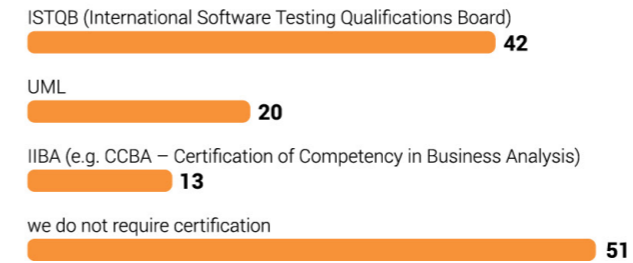In the field of big data analysis, we should mention PiLab,

founded in Wroclaw, whose founder Krystian Piećko was listed among the elite group of "Innovators Under 35" by the MIT Technology Review 2016 for an innovative data integration and analysis system DataWalk.[1]
Manual testing, which was handled by students, regardless of their education profile, is slowly becoming a thing of the past. It is being replaced by testing involving elements of automation or fully automated testing, where development of technological competences is desired among testers. Promotion of knowledge related to testing and developing competences in this area is supported by dedicated events (Wroclaw test:fest) or lectures during numerous technology meetups (e.g. DataArt Wroclaw IT talk).

[1] http://www.innovatorsunder35.com/innovator/krystian-piecko

The desired certifications in the field of modelling / analysis / testing (%)

ISTQB (International Software Testing Qualifications Board)	42
UML	20
IIBA (e.g. CCBA – Certification of Competency in Business Analysis)	13
we do not require certification	51

The expected level of knowledge of foreign languages

Knowledge of English is practically a mandatory skill in Wroclaw IT companies. Most employers (78 percent) require knowledge of the language at the advanced level (B2 or C1). Due to the geographical location of Wroclaw, many companies located in the city carry out projects for German clients or support German corporation branches, therefore German is the second most popular foreign language here. Half of the respondents requires its knowledge from their employees. French ranks in the third place – indicated by 19 percent of companies. Spanish was indicated by 13 percent of responders. Other languages received less than 10 percent of indications. Less typical languages also appear among those required by employers. For example, one of the companies surveyed indicated Portuguese, Greek, Hebrew, Chinese, Swedish and Dutch. Requirements relating to languages reveal the range of clients served by Wroclaw companies. They are dominated by companies operating in Western Europe, especially in German-speaking countries, as well as companies from North America and Central – Eastern Europe (excluding Poland).
Knowledge of foreign languages other than English and German is rarely required from programmers and relates primarily to technical support staff, consultants or project managers. In the event of a shortage of candidates with the knowledge of less common languages on the local market, IT companies recruit people from outside the industry (e.g. foreign students studying in Wroclaw) or acquire candidates in other countries and bring them

to Poland. Language courses are funded by most companies, and in some companies they even constitute a compulsory element of onboarding. Wroclaw IT organisations are truly international work environments.

Russian and Ukrainian languages deserves a special mention. Destabilisation of the political and economic situation in Ukraine has caused that the number of citizens of this country has been growing fast in Poland since 2014. Data from the Office for Foreigners indicate that Wroclaw is one of the most popular destinations of migration. Only in 2015, the Labour Office in Wroclaw received 36,000 applications from companies relating to employment of Ukrainian citizens. IT professionals are a significant portion of this migration, employed in virtually every major IT company in Wroclaw. The capital of Lower Silesia is also the destination of Ukrainian IT companies that are expanding (Softserve, Gorilla Group) or fully moving their business here.

The expected level of knowledge of foreign languages (%)

English	97
German	50
French	19
Spanish	13
Italian	9
Russian	9
We do not require the knowledge of foreign languages	6
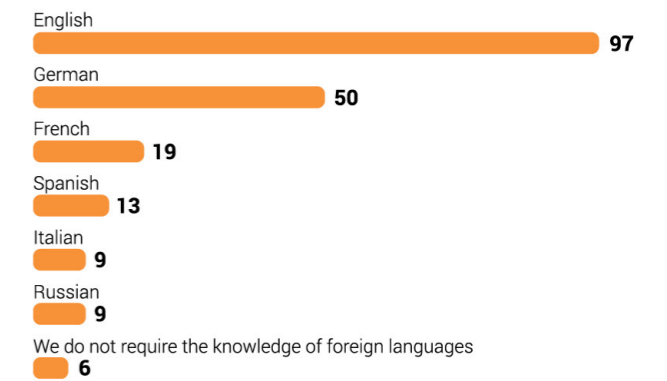
Other important competences

When asked about other competencies sought-after in the industry, the employers mention sales, action oriented on quantifiable effects, programming experience, basics of higher mathematics, statistical planning, basic understanding of the mobile market, business analysis with knowledge of investment banking, as well as soft skills such as communication skills, flexibility and ability to work in a group.

Piotr Krzysztofik, Head of Atos C&SI Global Delivery Center Poland

"Looking at the demand for IT services provided by Atos GDC Polska, we see that a knowledge of languages, especially German, is one of the most desired unique competencies demanded by our customers. Those familiar with this language will definitely find a lot of chances and
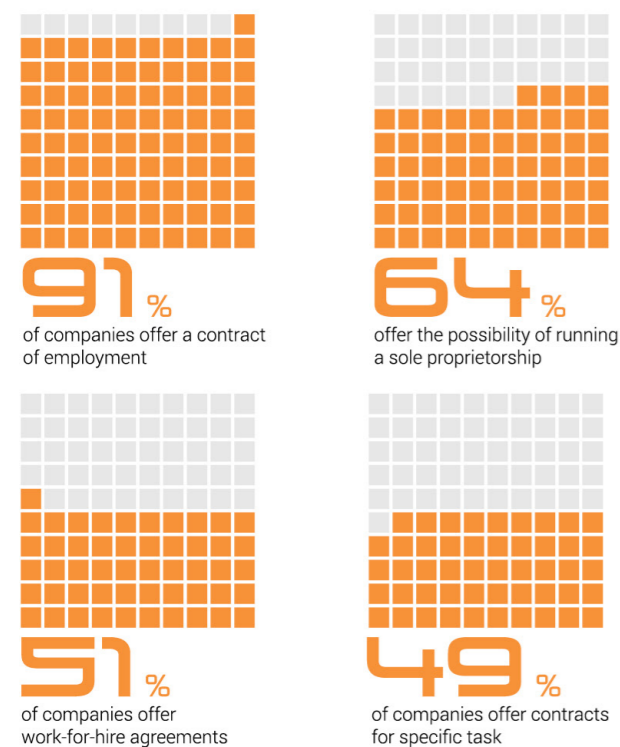*opportunities in IT companies. For our Global Delivery Center in Wroclaw, hiring specialist with the knowledge of the German language is primarily an additional asset through which we successfully gain and carry out projects for clients in Germany, Austria and Switzerland".*

THE LEVEL OF ATTRACTIVENESS OF THE OFFER

Offered types of contracts

Almost all IT companies in Wroclaw sign a contract of employment with their employees (91 percent of companies). However, a high demand for IT specialists causes that the employers have a flexible approach to the expectations of candidates in the area of the form of employment, and – if candidates are interested in such solutions – offer other possibilities:

The type of contract offered to employees by IT companies

91% of companies offer a contract of employment

64% offer the possibility of running a sole proprietorship

51% of companies offer work-for-hire agreements

49% of companies offer contracts for specific task

Employee leasing is used the least frequently, offered only by 11% of companies. **A large share of contractual employment** (agreement signed between two companies) is worth noting. This reflects the high level of job security in the industry – employees who are able to find a job without much trouble appreciate the advantages of flexibility such a contract and are happy to use them.
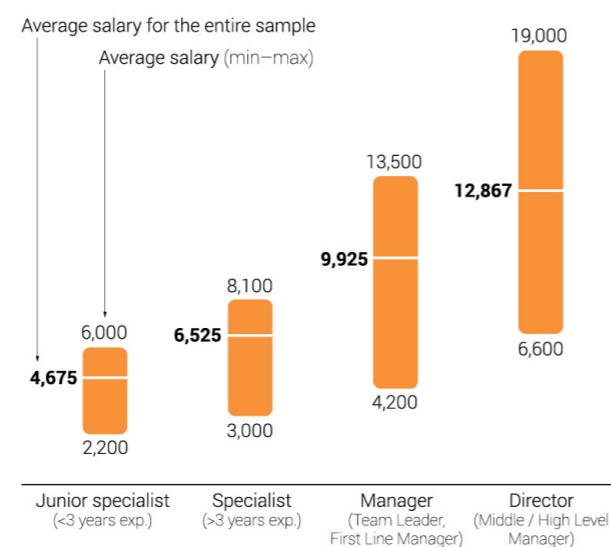
Salaries

The IT sector is one of the fastest growing sectors of the economy and wages are growing steadily. IT specialists are gladly being hired and are paid well even before graduation. This report is not payroll report, but we decided to ask the companies a general question about the level of salaries, to indicate range of wages, which new employers can expect in Wroclaw.
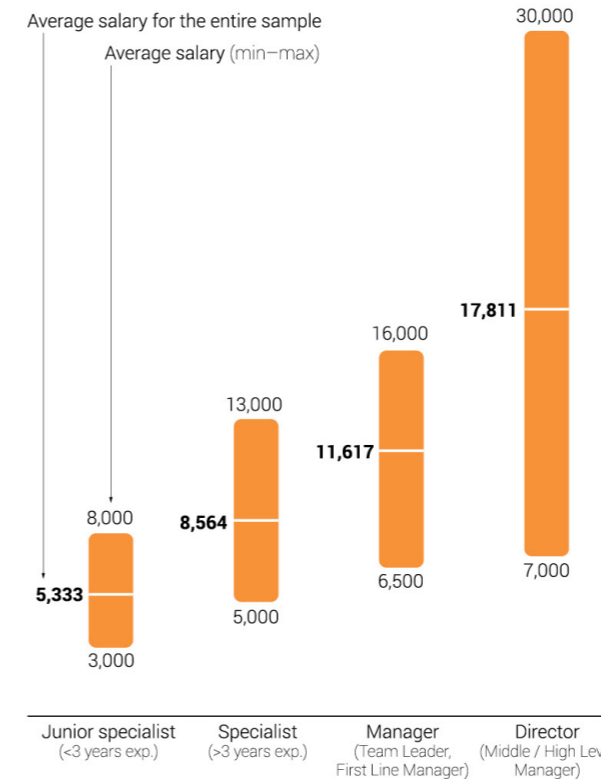
A characteristic feature of the industry is a **very large range of salaries** for the same positions – depending on the place of employment (company size, capital) and competences of the individuals, their pay in a similar position may vary by PLN 5,000–6,000. In the case of managerial and executive positions, salary ranges are even greater. The biggest differences in salaries offered in Wroclaw are visible in the area of software development, where on an executive position the gross salary ranges from PLN 7,000 to as much as PLN 30,000. Software development is a key specialisation of Wroclaw – developers are hired by Polish and international companies, startups and large corporations.
Hence the big differences in wages for similar positions. When determining compensation for a particular position, it is necessary to take into account the tasks and responsibilities of the employee, as well as the characteristics of the company.

The highest salaries – regardless of the level in the hierarchy – can be achieved by experts employed in the field of business applications. Even a beginner specialist (with experience of less than 3 years) receives a gross salary here of around PLN 7,000. For comparison, a junior specialist working in the field of infrastructure will be paid PLN 2,000 less. Developers are paid more than infrastructure specialists, but their wages are lower than business applications specialists.
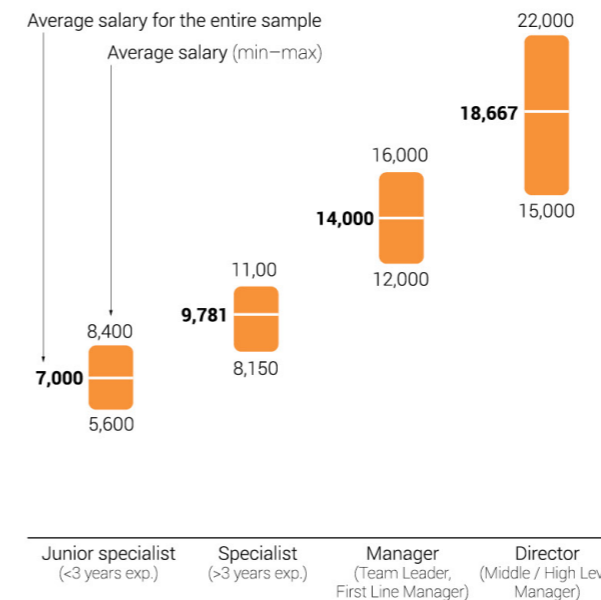
Infrastructure (PLN)

Average salary for the entire sample
Average salary (min−max)

Junior specialist (<3 years exp.)	Specialist (>3 years exp.)	Manager (Team Leader, First Line Manager)	Director (Middle / High Level Manager)
6,000	8,100	13,500	19,000
4,675	**6,525**	**9,925**	**12,867**
2,200	3,000	4,200	6,600

Software development (PLN)

Average salary for the entire sample
Average salary (min−max)

Junior specialist (<3 years exp.)	Specialist (>3 years exp.)	Manager (Team Leader, First Line Manager)	Director (Middle / High Level Manager)
8,000	13,000	16,000	30,000
5,333	**8,564**	**11,617**	**17,811**
3,000	5,000	6,500	7,000

Business applications (PLN)

Average salary for the entire sample
Average salary (min−max)

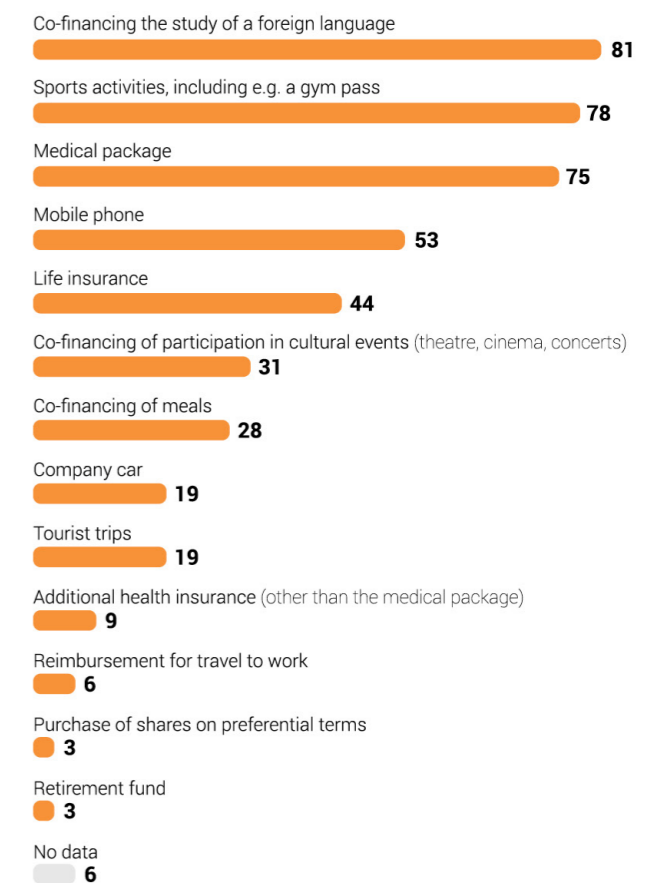| Junior specialist (<3 years exp.)	Specialist (>3 years exp.)	Manager (Team Leader, First Line Manager)	Director (Middle / High Level Manager)
8,400	11,00	16,000	22,000
7,000	**9,781**	**14,000**	**18,667**
5,600	8,150	12,000	15,000

Benefits

The offers of Wroclaw IT employers are dominated by a standard set of benefits also offered by companies in other industries and regions. On the list of additional benefits, attention is drawn to a very high position of funding the study of foreign languages – as many as 81 percent of the surveyed companies offer this benefit to their employees. Once again we are reminded how important language skills are to Wroclaw employers and how strongly internationalised the Wroclaw IT sector is.

Investing in the development of language skills among IT specialists is now a business necessity. The second most awarded benefit are sports activities, and the third - a medical package. Somewhat less common, but still awarded by more than half of the surveyed employers is a company mobile phone. Life insurance, co-funding the participation in cultural events, co-funding meals, a company car and tourist trips are also offered quite often. Other benefits are granted more rarely. The less common benefits cited by respondents in the category of "other, specify" include: fresh fruit, employee events, participation in sports events, sweets and pizza during workshops/special occasions.

Non-wage benefits offered most often (%)

Benefit	%
Co-financing the study of a foreign language	81
Sports activities, including e.g. a gym pass	78
Medical package	75
Mobile phone	53
Life insurance	44
Co-financing of participation in cultural events (theatre, cinema, concerts)	31
Co-financing of meals	28
Company car	19
Tourist trips	19
Additional health insurance (other than the medical package)	9
Reimbursement for travel to work	6
Purchase of shares on preferential terms	3
Retirement fund	3
No data	6

## Other elements shaping the work environment

The attractiveness of the place of employment, especially in the more competitive industries, is determined today not only by the level of remuneration and attractiveness of benefits, but also additional elements shaping the work environment. In the IT sector, tools related to a flexible approach to time and place of employment are very popular. In many companies, these tools are becoming elements of comprehensive programmes to support the balance between work and private life. An important place in the employers' offer is also occupied by benefits associated with professional development – technological training, participation in industry

conferences, as well as co-financing of certification exams. That's understandable, considering how important high and up-to-date specialist competences are in the environment of IT professionals. 62 percent of employers also value the development of soft skills necessary especially in a team work of projects.

Interesting and very characteristic for the IT industry is the use of the BYOD policy (Bring Your Own Device) in companies, which allows employees to use their own mobile devices (smartphones, tablets, etc.) in the workplace and for work-related needs. This trend increases the mobility and productivity of employees, leads to the spread of teleworking, giving a meaning to the term "I'm at work."

Generally, most of the IT companies, especially smaller software houses, in the communication with the candidates stress the characteristics that distinguish them from organisations working in more formal sectors – particularly the relaxed atmosphere and great flexibility in the approach to the time and place of work.
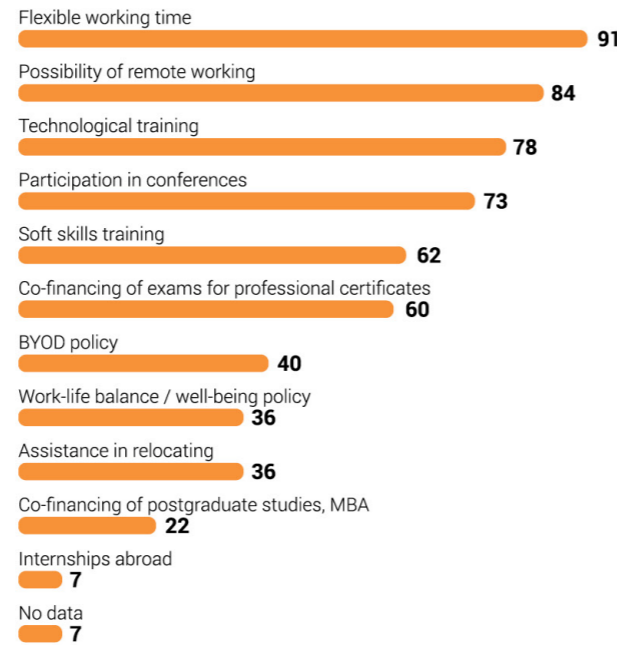
PREVIOUS RECRUITMENT EXPERIENCES

Positions easy and difficult to fill

The demand for IT professionals in Wroclaw has been growing for many years, which is the effect of an increasing scale of operations of companies already present here - both Polish and foreign, further investments of multinational companies in the capital of Lower Silesia and the growing number of emerging local technology startups. Finding a qualified employee is longer and more difficult than 5 or even 3 years ago, however, companied located here are still systematically expanding their teams. This is made possible by a high supply of university graduates, the influx of specialists from other regions of the country and abroad.
We also notice the growing popularity of entities and initiatives aimed at training and retraining of people outside the industry to be able to work in IT companies. During the study, Wroclaw employers identified positions which in their opinion can be filled relatively easily, as well as those in which they face difficulties while hiring.

As the easiest position to fill, 64 percent of companies specified testers. In the opinion of Wroclaw IT companies, it is also relatively easy to hire help desk specialists, which, after proper training, can even be filled with persons without technical education or foreign students studying in Wroclaw. At 9 percent each, companies also

recognised attracting webmasters and business analysts as easy. In the case of positions of a programmer and web developer, the employers are divided. Nineteen percent of companies do not have major problems with hiring a programmer, while 64 percent of organisations consider this position the most difficult to fill. These differences are the result of the search by the companies of specialists programming in a variety of more or less widespread languages. The situation is similar in the case of web developers – 7 percent of employers surveyed consider this position to be the easiest to fill, and 16 percent the most difficult. The surveyed companies also have recognised the positions of an IT systems/database designer/architect, business analyst, ERP/SAP or CRM consultant and IT network engineer to be difficult to fill.

In the case of "easier" positions, close to 50 percent of the companies close the recruitment process within a maximum of 4 weeks. Some companies deal with recruitment faster and obtain employees within two weeks, but there are some where the recruitment process extends to 6 weeks. In the case of "difficult" positions, only 29 percent of the companies manage to obtain a specialist in less than six weeks. Nearly 70 percent of the organisations need more time to find employees.

Additional elements shaping the work environment (%)

Flexible working time	91
Possibility of remote working	84
Technological training	78
Participation in conferences	73
Soft skills training	62
Co-financing of exams for professional certificates	60
BYOD policy	40
Work-life balance / well-being policy	36
Assistance in relocating	36
Co-financing of postgraduate studies, MBA	22
Internships abroad	7
No data	7

Top 5 of the easiest and the most difficult positions to fill

The easiest positions to fill
Nearly half of employers close the recruitment process within a maximum of 4 weeks.
1. Tester
2. Help desk
3. Programmer
4. Webmaster/business analyst
5. Webdeveloper

The most difficult positions to fill
For nearly 70% of employers, the recruitment process lasts more than 6 weeks
1. Programmer
2. IT systems/database designer/architect
3. Business analyst
4. ERP/SAP/CRM consultant
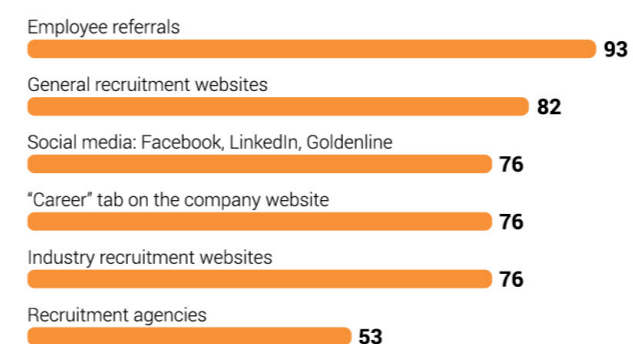5. Webdeveloper

Sources and recruitment methods used

The effectiveness of recruitment depends on the efficiency of sources and methods of acquiring candidates. As the most effective source, the companies surveyed indicate employee referrals.
They especially appreciate the high quality of the candidates obtained in this way. Due to the high competitiveness of the IT industry, paid employee referrals are becoming popular. Companies are willing to pay from few to several thousand zlotys for recommending a specialist with unique skills, if they are hired. External referral programmes are also appearing, where not an employee but a third person recommends their colleague to work in the company and receives remuneration for that.

The surveyed employers also pointed to general recruitment websites. As many as 82 percent of the surveyed companies publish their offer on such websites. 76 percent of employers pointed to social networking sites, the career tab, and industry recruitment websites – which they believe to be equally effective.
In the case of more difficult recruitment processes, more than half of employers reach for the support of recruitment agencies.

Among the methods for selecting employees used, interviews and recruitment tests are the most popular. The use of work samples is also widespread in the IT industry, allowing the company to evaluate the practical skills of candidates, for example, in regard to writing code or solving specific technical problems.
An assessment centre is a less popular recruiting tool, mainly used for the recruitment for senior positions, where skills related to human resources management, business thinking and change management are important.

The most frequently used sources of candidates (%)

Employee referrals	93
General recruitment websites	82
Social media: Facebook, LinkedIn, Goldenline	76
"Career" tab on the company website	76
Industry recruitment websites	76
Recruitment agencies	53

The most frequently used methods of recruitment (%)

Recruitment interviews	93
Recruitment tests	78
Work samples	47
Assessment Centre	13
Video recruitment	2
No data	4
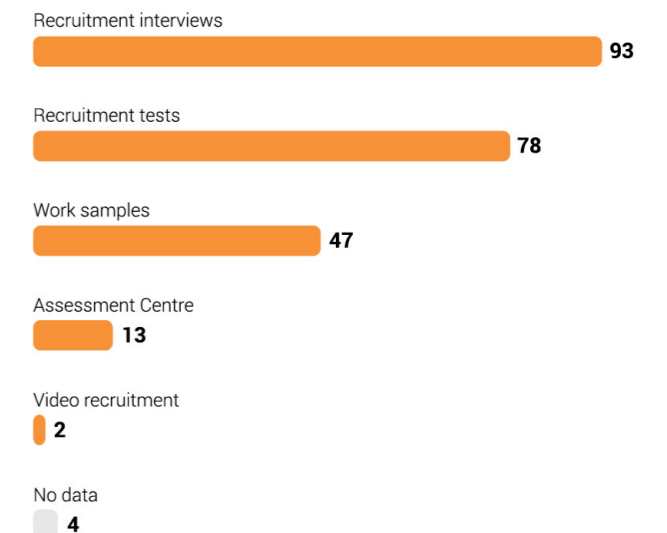
Actions undertaken in the field of employer branding

The employee market in the IT industry induces companies to actively build the image of the employer. In employer branding activities, it is crucial to base communications on real values arising from the work in the company. These values should be a testimony to the aspirations of the employer and make it stand out from other companies. Meanwhile, less than 30 percent of Wroclaw IT organisations have undergone the process of identifying the Employer Value Proposition.

Twenty percent of companies cannot answer the question about the EVP. Few organisations are aware of the values that distinguish them in the labour market. Given the high competitiveness of the Wroclaw market, this is a major gap in the personnel policies of the surveyed companies. Organisations with a strategic approach to building their image are more likely to attract the best candidates.

On the other hand, the surveyed companies use a wide range of employer branding tools. In the first place, they turn to social networks - 76 percent of Wroclaw employers in the IT industry build their image this way. More than 70 percent of companies are also active at universities, and 64 percent participial in industry conferences. Much less popular is participation in job fairs and the organisation of own conferences.

Less than a third of respondents also organises competitions for professionals, for example, hackatons, which make it possible to find programmers and are an opportunity to promote the company as an employer. Companies also open their doors to those interested in employment during open days.
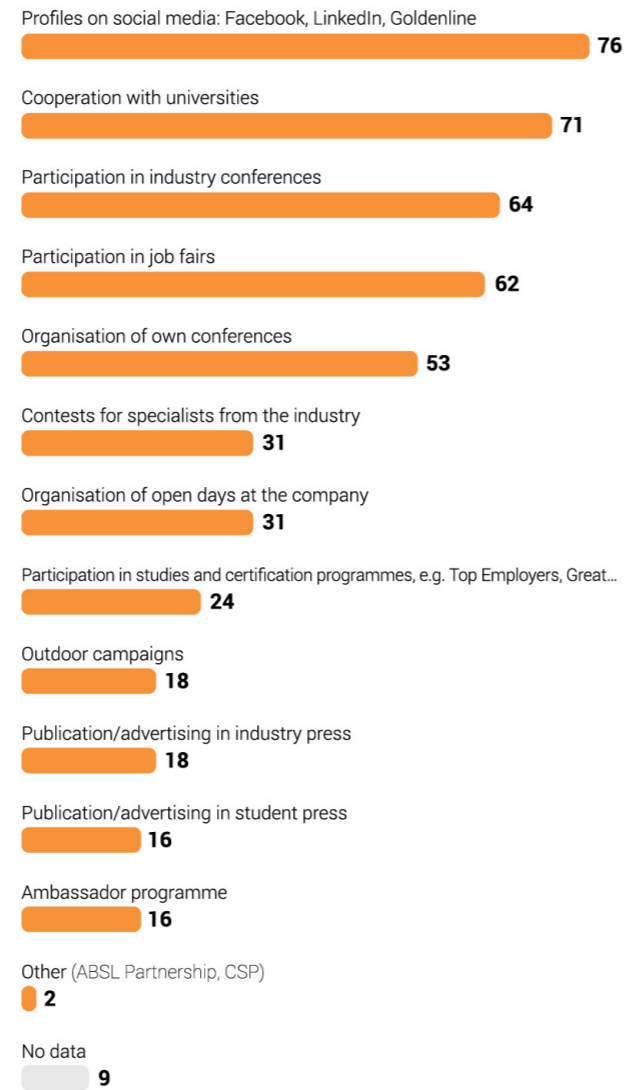
Nearly a quarter of companies appreciates the importance of different types of certificates confirming their good practices as employers (e.g. Top Employers, Great Place to Work). However, companies that have their own ambassadors in universities are a relatively small group. More organisations are already investing in outdoor campaigns or publications in the media. It seems that the network of ambassadors in the case of IT specialists is not as effective as in the case of acquisition of students in other fields. Effective management of this network requires a strong commitment on the side of HR.

Interesting, though less common practices include publications on the career page or including information about the salary level in the job offer (e.g. Netguru includes this information). In the competitive IT market, similar practices are welcomed by candidates. Companies are increasingly willing to also engage in popularising IT among students, as evidenced, for example, by initiatives of the city of Wroclaw supported by business, for example Working Machines [Pracujące Maszyny] (as part of the Wroclaw Codes programme) as well as among students of non-IT exact science majors. Companies are also trying to reach out to online communities bringing together experts in specific areas of IT, as well as inspire the formation of such communities, e.g. by organising themed meet-ups, which are an opportunity to exchange knowledge and experiences, while seeking to build the company's image among potential candidates.

A professional career page has become a standard in Wroclaw companies in the IT industry, with photos representing employees in an authentic working environment. Companies are trying to make themselves stand out from other employers by communicating additional elements of their offer, such as special programmes to provide employees with a balance between work and private life (e.g. Atos), or "breakfast for a start" – a shared morning meal funded by the company, which at the same time are an opportunity for integration and exchange of information (e.g. trans.eu). In employer branding, Wroclaw employers – similarly to the entire industry – strongly emphasise a lot of flexibility in the approach to the time and place of work.

ONLY 19 %
OF WROCŁAW IT
EMPLOYERS HAVE
IDENTIFIED THEIR
EMPLOYER VALUE
PROPOSITION

Tools used to build the image (%)

Profiles on social media: Facebook, LinkedIn, Goldenline **76**

Cooperation with universities **71**

Participation in industry conferences **64**

Participation in job fairs **62**

Organisation of own conferences **53**

Contests for specialists from the industry **31**

Organisation of open days at the company **31**

Participation in studies and certification programmes, e.g. Top Employers, Great… **24**

Outdoor campaigns **18**

Publication/advertising in industry press **18**

Publication/advertising in student press **16**

Ambassador programme **16**

Other (ABSL Partnership, CSP) **2**
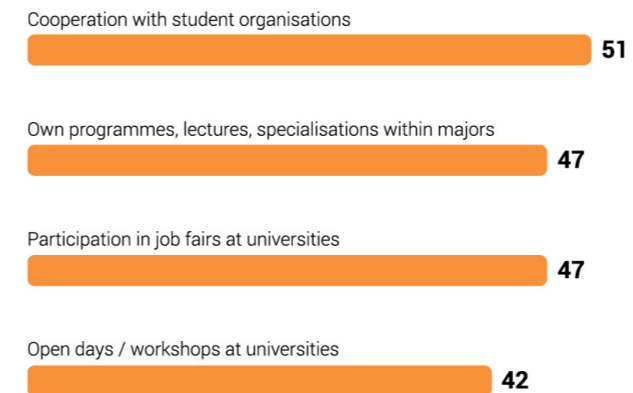
No data **9**

Cooperation with Wroclaw universities

Cooperation with universities has been undertaken by 71 percent of Wroclaw IT companies. Others focus on attracting employees with long work experience. Employers who enter into cooperation with universities choose mainly the public ones, mainly Wroclaw University of Technology (62 percent), Wroclaw University of Economics (31 percent) and the University of Wroclaw (18 percent). Cooperation with private institutions is established much less often, and to a lesser extent.

The vast majority of companies restrict themselves to cooperation with Wroclaw universities, which provide high-quality employees. Companies prefer to expand the scope of cooperation with local universities rather than undertake cooperation with educational institutions in other Polish cities. Among the universities from other locations, those indicated slightly more often than others included: Opole University of Technology, AGH Krakow, Technical University of Łódź, Warsaw University of Technology and various public universities located in Upper Silesia.

The main partner of the employers at universities are student organisations that are usually the instigators and organisers of various events, such as job fairs. Nearly half of the respondents are also engaged in educational cooperation with universities, organising own programmes or conducting lectures in the framework of existing programmes. This is also confirmed by the universities, which among the forms of cooperation with business most frequently mention consulting the curriculum and lectures for students.

Dominant forms of cooperation with universities (%)

Cooperation with student organisations **51**

Own programmes, lectures, specialisations within majors **47**

Participation in job fairs at universities **47**

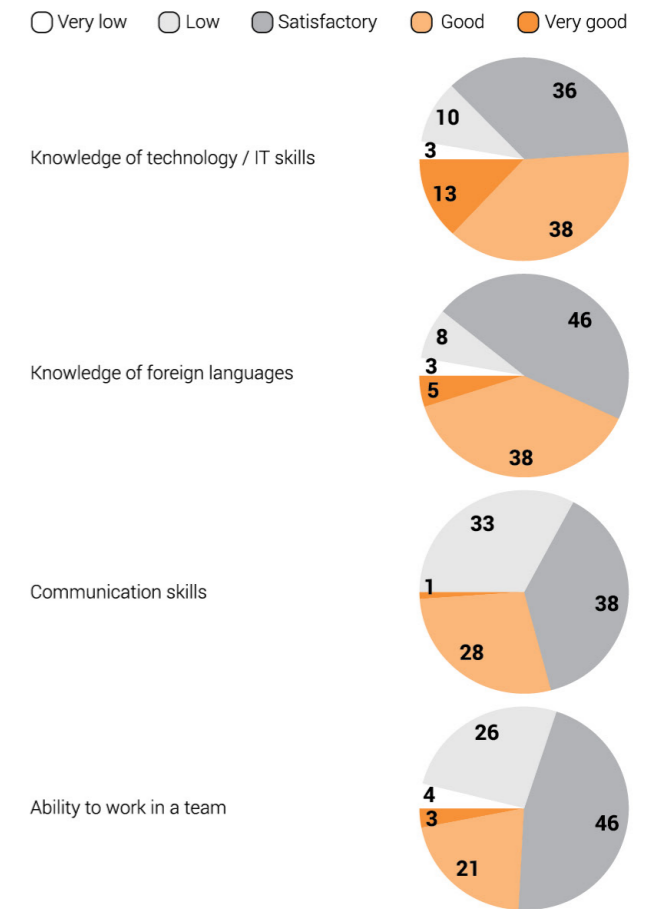Open days / workshops at universities **42**

Competences of the graduates

Employers consider the competences of graduates of Wroclaw universities as at least satisfactory. The graduates received top marks for the knowledge of foreign languages as well as the knowledge of technology and IT skills. In this last category, 13 percent of employers assessed the graduates very highly. Soft skills of IT specialists – communication and teamwork received lower scores. These surely are competences, which institutions should pay more attention to and try to develop in students. Many companies operating in Wroclaw work in large international and often remote project teams.

Communication and teamwork skills for such companies often are equally and in some positions even more valuable than technological competences. This is especially true when using agile methods for managing IT projects that require more intensive communication and collaboration, where the employee with high technical skills, but very weak soft skills can be a burden for the team or require the commitment of additional resources (time or staff).

Assessment of the level of competence (%)

○ Very low　○ Low　⬤ Satisfactory　⬤ Good　⬤ Very good

Knowledge of technology / IT skills: 36, 10, 3, 13, 38

Knowledge of foreign languages: 46, 8, 3, 5, 38

Communication skills: 33, 1, 28, 38

Ability to work in a team: 26, 4, 3, 21, 46

Łukasz Bratek, Director, Broadcast Technology Wroclaw

"Communication skills play key role in modern business. It is well recognized fact that most successful leaders are very often graduates of philosophy or philology and it's been proven that one's linguistic abilities are directly influencing performance on managerial positions. This phenomenon is as well true on technical positions. In companies such as Dolby very often decisions, including technical or architectural ones, are made based on a consensus among stakeholders. In such environment engineering knowledge and skills alone are useless – it must be accompanied by soft skills. The only way to have your idea implemented is to simply convince others. Therefore we put a lot of attention during recruitment process to verify candidate's ability to communicate clearly and we are particularly interested in team projects realized during studies".

THE FUTURE AND POTENTIAL OF THE
IT INDUSTRY IN WROCLAW

The history of existing investments and locally created IT companies clearly indicates that Wroclaw has the potential for the development and scaling of business in the IT sector. In the vast majority, initial declarations of investors about the planned employment are modified over time, and the indicated number of employees – multiplied. Equally strong growth dynamics is also observed among Polish companies, which is confirmed by the data collected. In 2015, the Wroclaw IT companies surveyed by us each hired 128 people on average. Twenty five percent of companies with the lowest increase of employment expanded their teams by up to 15 people, at the same time 25 percent of the surveyed companies have hired at least 150 people. In some companies, the number of newly employed reached as many as 1,000 people. Most recruitment processes resulted from the creation of new jobs, not from staff turnover.

At the end of 2016, 25 percent of the surveyed Wroclaw IT employers will have at least 238 employees hired. An average IT company in Wroclaw will have 90 employees. In the 3 largest companies surveyed, employment will reach - respectively – 1,000, 2,800 and 4,800 employees. The pace of development of the IT industry in Wroclaw is well illustrated by the case of Divante – member of the second-generation Polish technology companies.

◼ SUCCESS STORY: DIVANTE SOFTWARE HOUSE

2008
• The company is established.

2010
• Focusing on thearea of eBusiness – combining marketing and product innovation – Divante co-creates a new category of companies in the IT market (eCommerce Software House).

2011-2014
• Intensive development of the company, including through adapting new solutions and creating their own: Divante as one of the first companies in Poland introduces a success-fee settlement model and as one of the few offers a comprehensive end2end model (from implementation to logistics, payment, and even selection of products).
• The company creates software to support sales. The scope of its activities is becoming broader, with time encompassing auditing, design and implementation of complex omnichannel solutions, implementation and development of renown Enterprice Open Software platforms such as Magento, PimCore and OroCRM, as well as the design and implementation of dedicated solutions to support loyalty and marketing automation.

2015
• Sixfold increase in gross profit after three quarters of 2015.
• Divante becomes a part of the OEX group.
• Divante creates an R&D department.
• The company is granted the Forbes Diamond award.

2016
• Divante opens an office in the Netherlands
• Divante in the Top 200 of IT companies in Poland
• The company hires nearly 170 IT specialists such as developers, UX designers, marketing managers.

Divante Software House on www.divante.pl

Tomasz Karwatka, CEO Divante

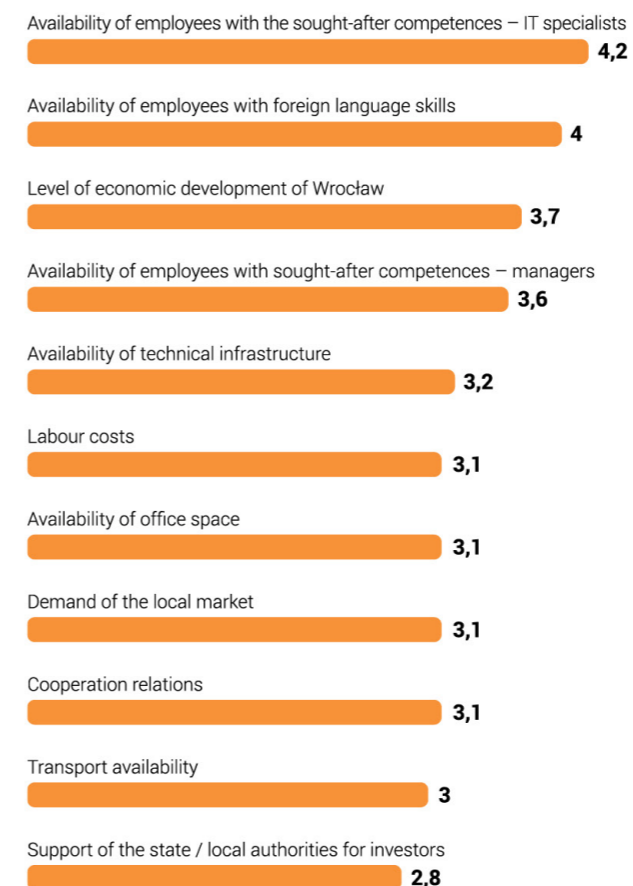*"A holistic approach, highly qualified specialists and world-class quality implementations is the reason why Divante has been selected as a technological partner by many companies. The company's clients include, among others, Intersport, ING, T-Mobile, Spiele Max, Odlo, Reserved".*

The most important factors promoting the development of IT companies in the Wroclaw agglomeration is undoubtedly the quality and availability of human capital – IT professionals and people who speak foreign languages. It is easier for employers to find specialists than managerial staff, but the availability of both of these categories of employees was values highly. And this despite the strong competition in the labour market in the industry.

Factors conducive to the development of ICT companies in the Wrocław agglomeration

(Respondents could evaluate each factor on a scale of 1 to 5, where 1 = slightly conducive, 5 = conducive to a very large extent)

Availability of employees with the sought-after competences – IT specialists **4,2**

Availability of employees with foreign language skills **4**

Level of economic development of Wrocław **3,7**

Availability of employees with sought-after competences – managers **3,6**

Availability of technical infrastructure **3,2**

Labour costs **3,1**

Availability of office space **3,1**

Demand of the local market **3,1**

Cooperation relations **3,1**

Transport availability **3**

Support of the state / local authorities for investors **2,8**

The second group of factors conducive to the development of IT companies in the capital of Lower Silesia are the characteristics of the city of Wroclaw itself – above all, the level of economic development of the city, but also the availability of technical infrastructure, absorption capacity of the local market and availability of office space. It attracts graduates and IT professionals from other regions in Poland and abroad.
Particularly noteworthy here is the numerous migration of specialists from Ukraine, for whom Wroclaw is one of the most attractive cities in Poland to relocate to.
City authorities conduct a proactive policy of facilitating the integration of newcomers, creating integrated classes, organising additional Polish language classes or creating a network of volunteers interested in supporting newcomers in learning the language and organising their lives in Wroclaw.

Future of the IT industry in Wroclaw

Wroclaw has enough academic, human, infrastructural and technological potential to ensure continued long-term growth of IT companies. Low labour costs still have an impact on the investment attractiveness of Wroclaw and the competitiveness of Polish companies.
Differences in labour costs of skilled IT professionals in Poland and other Western European countries range from 47 percent (Spain) to 70 percent (France)[3]. However, over time this gap will be reduced. At that point, further development of Wroclaw's IT sector will be depend on, on the one hand, ensuring the largest inflow of workers possible for the industry to avoid excessive wage growth, on the other hand, creating an environment conducive to development and raising the level of sophistication and quality of manufactured products and services. The significance, attractiveness and innovation of Wroclaw as a technology and IT centre will depend on whether it will remain mostly a location focused on services, or whether companies producing their own products and IT services will grow in greater numbers and more quickly here.

[3] http://mckinsey.pl/wp-content/uploads/2016/08/Cyfrowa-Polska.pdf

Yevgeniy Shevchenko, Managing Director, CEE region, Gorilla Group

"Wroclaw is known by its solid educational base, great geographical location which means good connectivity with the rest of Europe and business friendliness.
Wroclaw Agglomeration Development Agency helps foreign companies to make first steps in new country and city. Comparing to Ukraine, it is much easier to conduct business in Poland. There is definitely more clarity here with tax and legal procedures; you know the law and you obey the law.
Adding such factors as stable economic situation, access to EU markets and better connection to the world, we are provided with a business friendly environment for entrepreneurship".

Given the results of the survey and the information gathered during the in-depth interviews with representatives of the sector, we can indicate the following recommendations for actions to support the development of the IT industry in Wroclaw from the perspective of human resources:

1. Cooperation with universities

• Increasing the level of the university's awareness of the industry's needs in regard to training of programmers. More emphasis on modern and popular programming languages as well as currentand practical application of technology in business.
Communication and teamwork skills are also extremely important, the development of which has not be given enough attention so far. We hope that the second part of this report, containing data about universities, will allow companies to establish more intensive and effective cooperation.

• Increasing the level of awareness among students about IT companies operating in Wroclaw, through the organisation of lectures, seminars and workshops of an informational and educational nature (for example the Wroclaw Does IT initiative), it is also possible to use an online information platform.

• Development of cooperation in the field of education, not only those with strictly technical competences, but also project managers, data analysts and business analysts, UX specialists, etc.

• Expanding cooperation in research and development – joint projects of companies and universities.

• Study programmes and specialisations implemented in cooperation with business.

• Increased activity of the university (career offices) in the mediation of work - actively approaching students with information about offers from employers relating to employment and internships.

• Appointment of a person in each university who will act as a partner and guide to business.

2. Technological education of young people and people from outside the industry

• Events and educational projects to promote technological education.

• Courses (including postgraduate) for people wishing to retrain.
• An online platform, supported by the companies, for self-education in programming, testing, etc.

3. Attracting professionals from outside of Wroclaw

• Profiled systems of employee referrals and related bonuses,
• Establishing cooperation by the companies with universities outside of Wroclaw.

• Support for potential employees in relocation, including of international employees, e.g. handling formal issues for the employee, e.g. related to visas and work permits.

• Development by the city of a programme to support the integration of foreigners, promotion of best practices of companies in this field.

• Involvement of the companies in the promotion of Wroclaw as an attractive place of residence during studies and later – during one's career.

4. Activation of the Wroclaw community related to the industry:

• An online platform informing about events (or the use of an already existing one, for example crossweb).

• Organisation of events aimed at networking of event organizers and companies.

• Organisation of industry conferences with a technology and business profile.

Further development of the IT industry in Wroclaw will be supported by good prospects for the entire sector in our country. Structural funds are a great opportunity. In 2014–2020, Poland will invest 82.5 billion euro from the EU cohesion policy.

These funds will be earmarked, among other things, for the digitization of the country – high speed Internet access and e-government services. The Digital Poland programme will receive 2.17 billion euro. In the plan developed by Deputy Prime Minister and Minister for Development Mateusz Morawiecki, the IT sector has been identified as one of the sectors in which there is a chance to obtain a leading position in the global market. We should take advantage of this opportunity.

THE DEMANDS
OF EMPLOYERS TO UNIVERSITIES

Regarding the curriculum, teaching other languages in addition to English, German, French.

More in classes/information on application maintenance in the programme. Introduction to business analysis.

Greater openness to SMEs.

Initiating research, raising funds from national and European sources of financing for the implementation of joint projects, implementation of projects aimed at training future engineers for the needs of employers, joint organisation of different types of classes at universities, cooperation in order to define/consult on educational programmes which take into account the current needs of the labour market, organisation of internships for students, support in the employment of graduates.

Sending students to internships.

Working with students on specific business cases.

Preparing a dedicated person/team for cooperation with business.

Each university should have one person for contact with our company in the form of an account manager, so we don't have to spend time managing relationships with several people per institution. Our employees should be involved in the activities of the Career Office and as lecturers of practical subjects.

Photo: Divante

UNIVERSITIES' OFFER

EDUCATIONAL POTENTIAL
OF POLAND IN REGARD TO MEETING THE NEEDS OF EMPLOYERS IN THE IT INDUSTRY

One of the most frequently indicated strengths of Poland as a location for investment is human resources, including a high supply of educated students and graduates of different specialities possessing foreign language skills. In 2015, more than 1.4 million people studied in Poland. This gives our country the 6th position in Europe in terms of the number of students. In the same year, almost 400,000 graduates entered the labour market.

In the years 1998–2012, 7.2 million people graduated from universities and colleges, which is the largest number of graduates in this period throughout the European Union. Of this number, 800,000 received degrees in exact sciences, and 182,000 in IT. At the same time, Poland is one of the European leaders in education in exact science majors, with a 2.2 percent share of graduates with an exact science profile in the total population aged 20–29, while the EU average is 1.7 percent (data for 2014).

For several years, the interest of young people in studying at technical universities has been on a steady level in our country (3.8 candidates per place in 2016), and particularly information technology, which in 2016 was applied for by as many as 35,137 people. Information technology ranks first on the list of the most popular fields of study in Poland continuously since 2013.[4] More than 68,000 future IT specialists are currently studying in universities in Poland.[5] Every year, several thousand graduates with a degree in computer science enter the labour market. What attracts young people to computer science and related fields is mainly the ease of finding a well-paid job in the profession, often already while at school.[6] A major role in building the prestige of the profession of an IT specialist is also played by the successes of Polish teams in international competitions such as the world championships in the coding Hello World Open, international competition Capture the Flag (CTF) related to the security of IT systems, as well as ImagineCup, CodeCup or Central European Programming Contest (CEPC). They are a proof of the high-quality of IT education in our country.

In the Human Capital Balance 2013 study, almost every Polish IT student declared knowledge of English (94%), and almost a third – knowledge of the German language.

[4] Information about the results of admissions for the academic year 2015/2016 in universities supervised by the Ministry of Science and Higher Education, http://www.nauka.gov.pl/g2/oryginal/2015_12/27a9652393f0ad67aa93f16b04dd9127.pdf
[5] Universities and their finances in 2014, Central Statistical Office, Warsaw 2015
[6] IT specialist - sought-after and well-paid, pracuj.pl, 30.06.2016

EDUCATIONAL POTENTIAL OF WROCLAW

Wroclaw is one of the largest academic centres in Poland. Almost 125,000 students are enrolled here in 24 universities. In 2015, more than 32,000 graduates left the walls of Wroclaw universities.
In addition to Warsaw, Krakow and Lublin, Wroclaw is one of the educational centres chosen most often by foreigners.

The capital of Lower Silesia is one of the largest centres of education of IT specialists.
Nearly 14,500 young people are enrolled in computer science and related fields, of which 7,819 in computer science itself.
Wroclaw University of Technology – the largest technical university in the region and one of the best of its kind in the country (2nd place among the technical universities in Poland in the ranking of the monthly magazine Perspektywy), currently with 10,205 young people enrolled in computer science and related fields.

In 2015, Wroclaw universities sent out 2,524 graduates of computer science and related fields to the market, of which 48 percent were graduates of computer science.

In Wroclaw alone there are currently 9 universities that offer the opportunity to study computer science and related fields, including the University of Business in Wroclaw, which will start its computer science major in October 2016.
In addition, there are 6 schools located in other Lower Silesia cities – Legnica, Swidnica, Polkowice, Zielona Gora and Glogow. Below are the details of the offer of Wroclaw universities in regard to education in computer science and related fields, information on curricula and forms of cooperation undertaken by individual universities with business.

POLAND
1,405,133 students
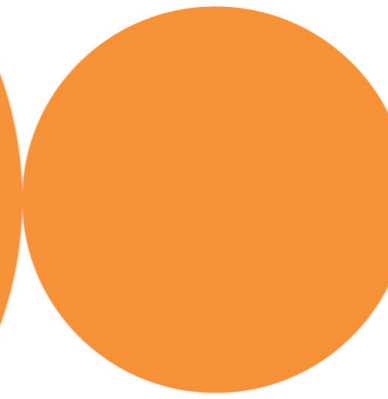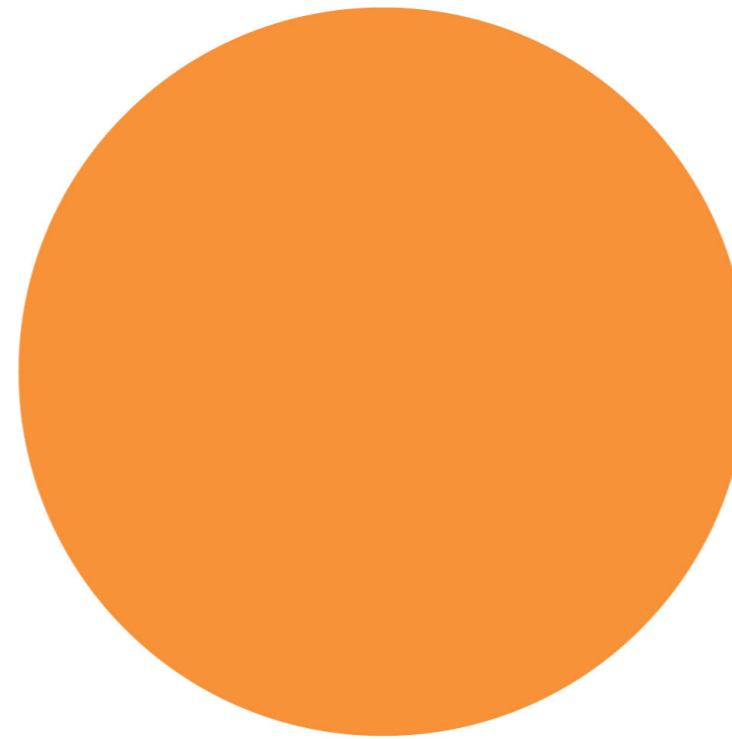
395,192 graduates

more than **68,000**

35,137 applicants for IT and related fields in 2016

9,700

computer science students	students in related fields	computer science graduates	graduates in related fields

LOWER SILESIA
134,525 students

35,481 graduates

WROCLAW
124,440 students in total

9 universities educating students in Wrocław for the needs of IT companies
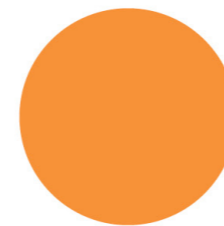
32,328 graduates

34,831 students of exact sciences (technology, industry)

7,819 **6,668** **1,224** **1,300**

OTHER TOWNS IN LOWER SILESIA

487 **580** **101** **146**

Sources: CSO – 2015, Ministry of Science and Higher Education – 2016

students | graduates

computer science and related fields

students | graduates

students of information technology (Pure IT)

graduates with a speciality in IT (Pure IT)

33,530

7,732

10,306

1,678

5,102

1,224
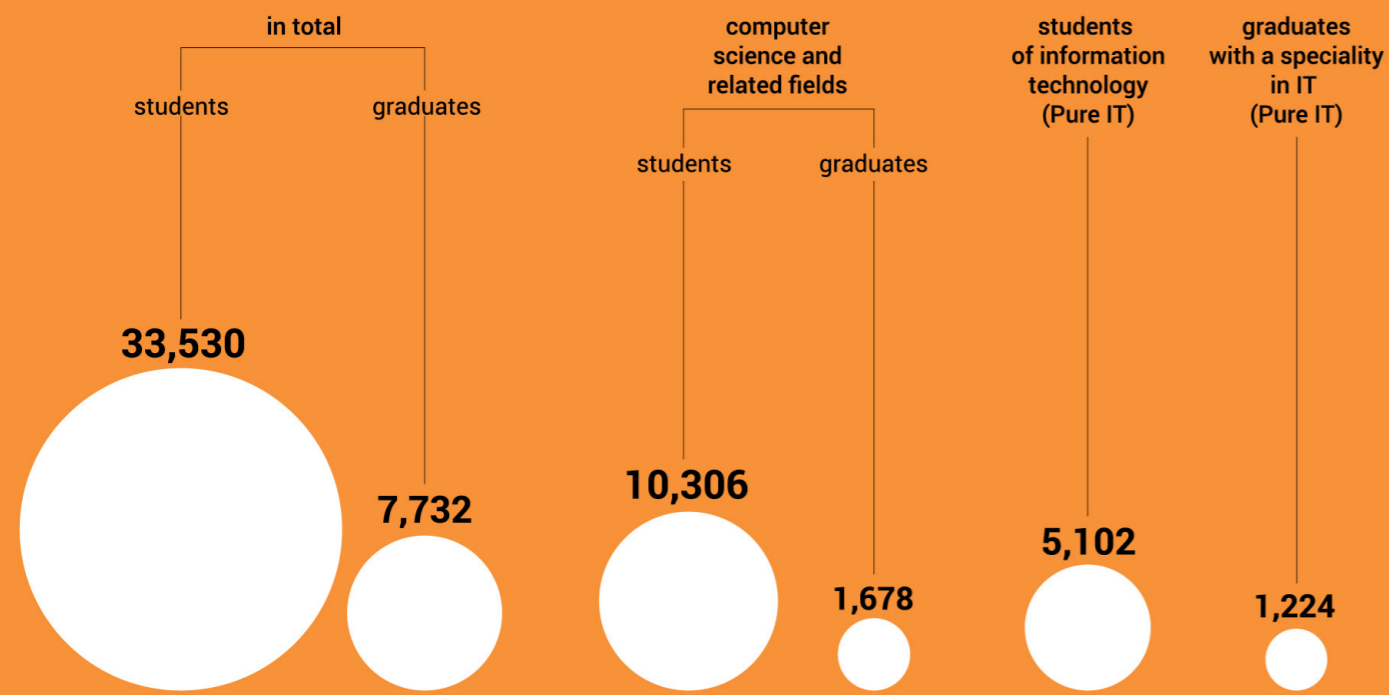
academic year 2015/2016

WROCLAW UNIVERSITY OF TECHNOLOGY

Politechnika Wrocławska

A key position on the educational map of Wrocław is held by the Wroclaw University of Technology. In 2016, the Wroclaw University of Technology took second place in Poland among technical universities in the ranking of the Perspektywy monthly magazine, right behind the Warsaw University of Technology.

Majors and specialities related to computer science can be studied here at two faculties: Electronics and Computer Science and Management. Additionally, the University offers a range of related fields, such as telecommunications, systems engineering and technical mathematics.

1. FACULTY OF ELECTRONICS

3,305 students in IT-related courses and majors | **1,028** students in IT-related courses and majors

IT-related courses and majors

Computer Science	IT systems in medicine, Information systems engineering, Web engineering, Computer systems and networks, Advanced Informatics and Control, Internet engineering, Web systems engineering
ICT	CT Network Maintenance, ICT Network Design
Automation and Robotics	Computer control networks, robotics, computer management systems for industrial processes, information technologies in automation systems, information systems in automation, automation and robotics systems, Embedded Robotics

Training program

Programming languages	C/C++, C#, SQL, RPG, HTML, HTML5, Java, CSS, PHP, SAS 4GL, SAS IML, MDX, Matlab
Advanced technologies	Cryptography, security, computational intelligence, artificial intelligence, expert systems, biomedical signal or imaging processing, advanced methods of optimization. In the context of big data, the issues discussed are dedicated to: • data warehouses and basics of building business intelligence systems • machine learning • latest mass storage technologies • cloud solutions (Software Defined Storage, Virtual Data Center, etc.), implementation of cloud services and cloud computing infrastructure • becoming familiar with SAS Enterprise Miner, which is an environment that enables exploring the process of knowledge discovery in databases.
Algorithmics	Probabilistic algorithms, distributed, approximate, numerical.
Programming paradigms	Object-oriented, imperative, functional.
Option to acquire certificates from software vendors	It is not possible to acquire certificates while studying, but the curricula prepare for the acquisition.
Option to acquire certificates in administration/security	Cisco CCNA, CCNA 2, CCNA 3, ICND1, ICND2, EMC Academic Associate, EMC Cloud Infrastructure and Services Associate (EMCCIS), discount vouchers for EMC Information Storage Associate (EMCISA) certificate exams.
Certificates in modelling/analytics/testing	It is not possible to acquire certificates, but the curricula prepare for the acquisition.
Project management certificates	It is not possible to acquire certificates, but the curricula prepare for the acquisition. PM-dedicated courses are based mainly on the PMI path (PMBOK).
Soft skills	The study program includes basics of quality management and social communications.

Language classes	English, German, French, Spanish, Italian, Russian, Japanese.
Classes in foreign languages	Yes, in English.
Traineeships and internships	The program includes mandatory traineeships/internships. Paid or unpaid, depending on the agreement between the student and the employer. There are internship opportunities abroad.

Forms of support for students /employers in establishing relationships (internships / traineeships / employment)

The University runs a career office which helps students reach attractive traineeship/internship and employment offers; academic job fairs are held, as well as meetings with employers (workshops, training courses, lectures, presentations), speed recruiting and the ambassador program.

Cooperation with the business environment

The faculty cooperates with business in education, execution of research projects and student projects.
• Under **Konwent Wydziału Elektroniki (Faculty of Electronics Convention)**, the co-operators include:
  Nokia Wroclaw, Dolby Poland Sp. z o.o., Capgemini Polska SP. z o.o., Radio Wroclaw, Volvo Polska Sp. z o.o. IBM Polska Sp. z o.o,
  Tieto Poland Sp. z o. o. and Transition Technologies S.A.

• Under **Konferencja Projektów Zespołowych (Team Project Conference)**, the co-operators include:
  Capgemini Polska SP. z o.o., Comarch S.A., FANUC Polska Sp. z o.o., Mitsubishi Electric, Neurosoft Sp. z o.o., Nokia, PGS Software S.A.,
  PiLab S.A., REC Sp z o.o., Sonel S.A., Thaumatec Sp. z o.o., Tieto Poland Sp. z o.o., Data Art.

• Cooperation with the business environment (a few dozen companies) also happens within the cluster **Wspólnota Wiedzy i Innowacji**
  w Zakresie Technik Informacyjnych i Komunikacyjnych.

• Representatives of Nokia and Credit Suisse run classes for students at the Faculty.

Contact person for business / University contact details

Politechnika Wroclawska Wybrzeże Wyspiańskiego 27 50-370 Wroclaw	Wroclaw University of Science and Technology – Centrum Wiedzy i Informacji Naukowo-Technicznej – Center for Science and Economy Cooperatoin, Wydział Elektroniki – Przemysław Magdziarz

2. FACULTY OF COMPUTER SCIENCE AND MANAGEMENT

2,418 students in IT-related courses and majors

56 Computer Science graduates (level 2 course)

151 Computer Science graduates (level 1 course)

51 Systems Engineering graduates (level 1 course)

IT-related courses and majors

Systems Engineering	Level 1 and 2 courses.
Computer Science	Level 1 and 2 courses. Majors: Safety and Reliability of IT Systems, Intelligent IT Systems, Software Engineering, IT Systems Design, Database Systems, Information Systems, Decision Support Systems, ICT.
Post-graduate courses	Computer network administration, Multimedia and mobile systems, Internet technologies, Project management. Plans for postgraduate studies: "Android and iOs – modern mobile applications."

Training program

Programming languages	C/C++, C#, Objective-C, Java, Asembler, ActionScript, Scala, OCaml, XTML5, Prolog.
Advanced technologies	Mobile applications, multimedia applications, systems security, data mining, data warehousing, integration of information systems, computational intelligence, knowledge engineering, cryptography, parallel and distributed programming, image and digital video processing, artificial intelligence, artificial neural networks, decision support systems
Algorithmics	Evolutionary algorithms, genetic algorithms, geometric algorithms, graph algorithms, clustering algorithms, iterative algorithms, ant colony optimization algorithms, parallel algorithms, control algorithms, systolic algorithms, encryption algorithms, fast Fourier transform algorithms, backtracking, greedy algorithms

Programming paradigms	Object-oriented, imperative, functional, concurrent paradigm.
Option to acquire certificates from software vendors	ECDL (European Computer Driving Licence) Certificate CISCO Academy participation certificate – Cisco Networking Academy (preparation for the CISCO certification exam – CCNA and CCNP)
Option to acquire certificates in administration/security	CRC certificate (Corporate Readiness Certificate) – a program organized by IBM, ING Services Polska and ING Bank Śląski.
Certificates in modelling/ analytics/testing	Software Testing Certificate (MultiTrain).
Project management certificates	IPMA (International Project Management Association) Certificate.
Soft skills	IT system projects delivered in teams, Computer programs developed in teams.
Language classes	Mandatory English and a second foreign language of choice.
Classes in foreign languages	In the course Computer Science level 1 and 2, in one of the groups, all the classes are taught in English.
Traineeships and internships	The traineeship can be completed as a selectable course. Traineeships are paid or unpaid – depending on the agreement between the student and the employer. There is an option of traineeship / internship abroad under LLP ERASMUS and CEEPUS programs.

Forms of support for students /employers in establishing relationships (internships / traineeships / employment)

The University runs a career office which helps students reach attractive traineeship/internship and employment offers; academic job fairs are held, as well as meetings with employers (workshops, training courses, lectures, presentations), speed recruiting and the ambassador program.

Cooperation with the business environment

Cooperation with business units takes many forms:
• Activities for students: Autodesk Polska, Capgemini, InsERT, PGS Software, Volvo IT Polska
• Suggested topics for theses and projects work carried out as collaborative projects of the Engineering Project Team: InsERT, Nokia Networks (Nokia Siemens Networks), Volvo IT Polska;
• Joint projects: Microsoft Corp., Kruk S.A.
• Sponsorship for competitions: AXIT, Genesi, InsERT, Janmedia, PGS Software, Techland, Yumasoft, Volvo IT Polska;
• Co-organization of seminars under Forum Firm Informatycznych:
  Advatech, AION, BI-Technologies, Capgemini Polska, DROPTICA, Gisplan, GrabSoft, Huzar Software, Innovation Technology Group – Cube.IT, InsERT S.A., IT-Dev, Nokia Networks (Nokia Siemens Networks), Optopol Technology, PGS Software, Produs, PSI, QAD Polska, SHH, SQAM, TestBenefit, THB Systemy Informatyczne, Techland, Toshiba Television, VEGANET, Volvo IT Polska, VULCAN.

Contact person for business / University contact details

Politechnika Wroclawska
Wybrzeże Wyspiańskiego 27
50-370 Wroclaw

3. DEPARTMENT OF BASIC TECHNICAL PROGRAMS (WYDZIAŁ PODSTAWOWYCH PROGRAMÓW TECHNIKI)

approx. **170** students in IT-related faculties and majors (altogether level 1 and 2 courses)

approx. **80** graduates of IT-related courses and majors (level 1 courses), approx. **30** graduates (level 2 courses)

IT-related courses and majors

• Algorithmics
• Computer Security

Plans to launch a Big data course in two years

Training program

Programming languages	Mainly: C, C++, Java, Python Additionally: Julia, JavaScript, PHP, Ada, Mathematica, Scala.
Advanced technologies	Cryptography, quantum calculations, autoreview, heuristic algorithms.
Algorithmics	Probabilistic, distributed, numerical, approximation algorithms, formal languages and grammars (compilers).
Programming paradigms	Imperative, object-oriented, functional programming in logic (Prolog).
Soft skills	Team-based programming.
Language classes	Wide range of foreign languages study opportunities
Traineeships and internships	Mandatory minimum 4 months' traineeship. Any IT-oriented scope. Part of traineeships are abroad – mainly level 2 students at Max Planck Institute in Germany.

Forms of support for students /employers in establishing relationships (internships / traineeships / employment)

The University runs a career office which helps students find attractive traineeship/internship and employment offers.
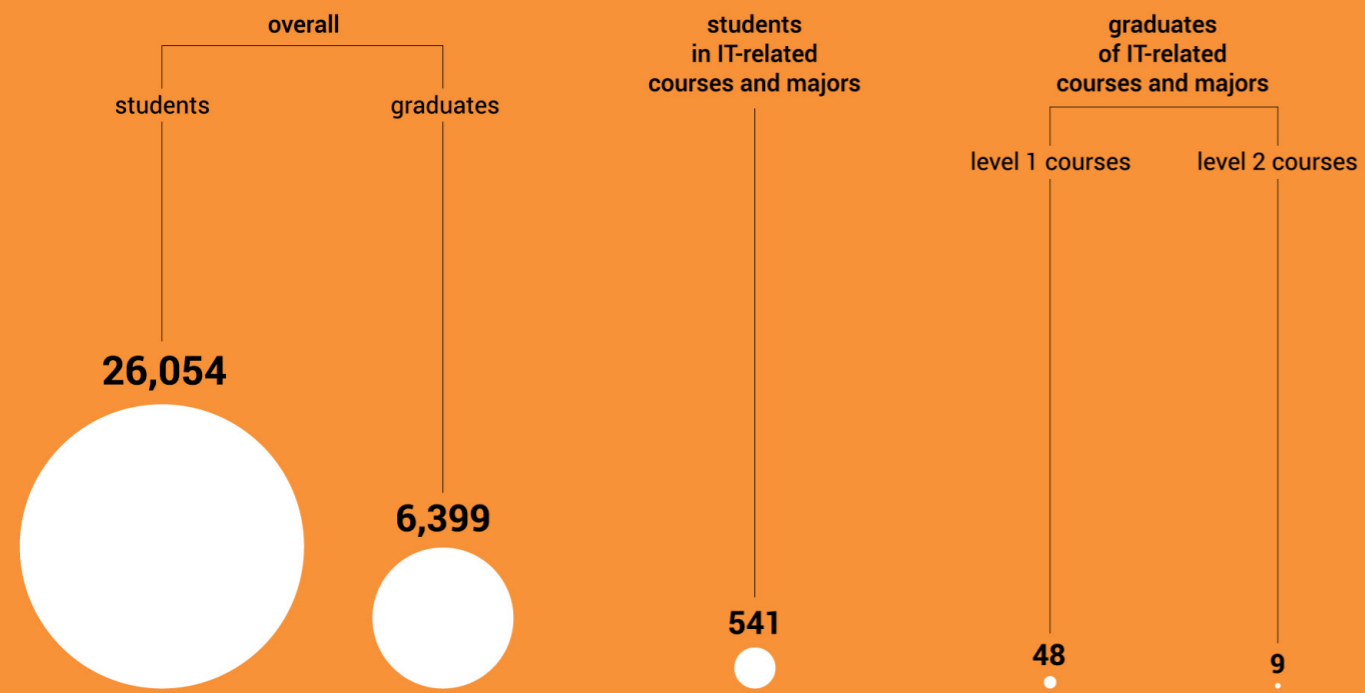
Cooperation with the business environment

The University cooperates mainly with companies dealing with software for telecommunications, identification and electronic authentication, embedded devices, secure programming. The companies co-deliver classes such as: reverse engineering and advanced software development methods.

Contact person for business / University contact details

Politechnika Wroclawska
Wydział Podstawowych Programów Techniki
Wybrzeże Wyspiańskiego 27
50-370 Wroclaw

Infographic (left page)

overall
- students
- graduates

26,054 (students)

6,399 (graduates)

students in IT-related courses and majors

541

graduates of IT-related courses and majors
- level 1 courses
- level 2 courses

48 (level 1 courses)

9 (level 2 courses)

years 2015, 2015/2016

UNIVERSITY OF WROCLAW

Uniwersytet Wrocławski

The University of Wroclaw is one of the oldest universities in Central Europe. 2002 marked its 300th anniversary.

Today, it is a modern institution with close to over 26,000, doctoral candidates and post-graduate students.

IT-related courses and majors

- Computer Science.
- Individual Studies in IT and Maths (Indywidualne Studia Informatyczno-Matematyczne).

Training program

Programming languages	In the first semester, the students can choose to study C or Python at their discretion. In the second semester, they study Haskell and Prolog as mandatory courses. In addition, this year's choice includes: C++, Python (expanded, including Django), Java, .NET (including C# and ASP.NET), OCaml, R and Matlab.
Advanced technologies	Elective courses related to analysis and exploration of large data, graphics and creating images and animations, cryptography, natural language processing, artificial intelligence, neural networks, and speech synthesis.
Algorithmics	Classes mandatory for all students include classical, graph algorithms, algorithms on strings and randomized algorithms. In addition, the program includes elective courses on the algorithmic game theory, approximation, evolutionary, probabilistic, distributed algorithms as well as algorithms on strings and algorithms in wireless communication and computer networks.
Programming paradigms	Object-oriented, functional, logical/declarative and imperative programming.
Soft skills	Engineering students must and undergraduate level students may complete at least one team development project. Additionally required is the completion of at least two subjects in humanities; this year, the choices included positive psychology.
Language classes	English (mandatory), German, French, Italian, Russian, Spanish, Portuguese.
Classes in foreign languages	20% of subjects taught in English.
Traineeships and internships	The students are required to have worked as an intern for at least 3 (bachelor) or 4 (engineering studies) weeks. The internships are paid or free – depending on the agreement between the student and the employer. There are internship opportunities abroad.

Forms of support for students /employers in establishing relationships (internships / traineeships / employment)
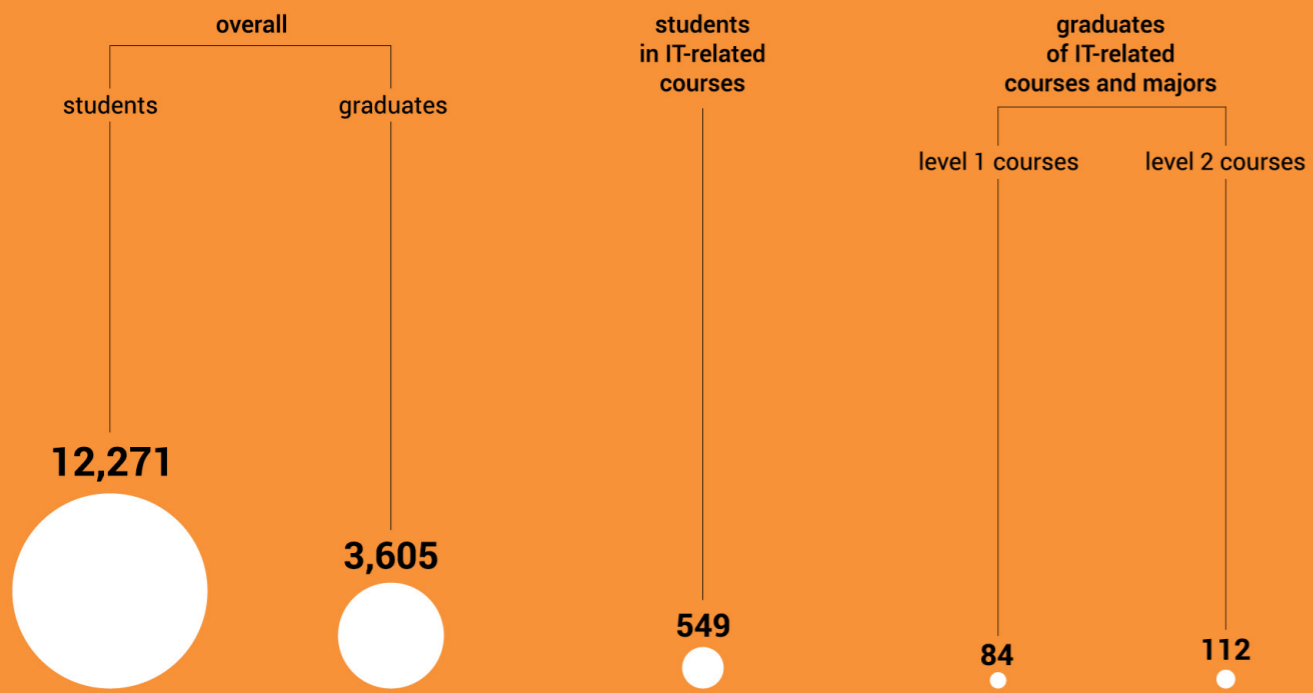
Organized at the university are IT job fairs (previous edition, April 14, 2016), a series of lectures and workshops, Wroclaw Does IT, Innovative Companies Day and recruitment meetings with individual companies (most recently NSN); we also have Innovative Companies Day. Students find their own traineeships/ internships/ employment at a company; should they have a problem, they can turn for help to a delegated employee.

Cooperation with the business environment

Cooperation with the business environment focuses on organizing student traineeships and conducting classes for students. Guest lectures as part of courses (including software engineering) are lead by e.g., NSN, Credit Suisse and Volvo IT.
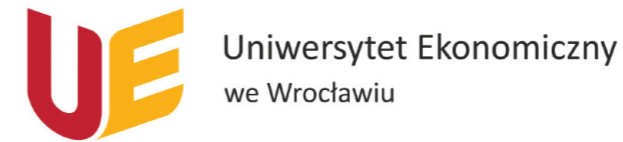
Contact person for business / University contact details

University of Wroclaw
pl. Uniwersytecki 1
50-137 Wroclaw

- Przemysława Kanarek (classes conducted by companies)
- Leszek Grocholski (student traineeships and internships)
- Leszek Pacholski, Piotr Lipiński (relations with businesses wishing to collaborate on technology and research, not teaching)

Infographic

overall

students   graduates

12,271

3,605

students
in IT-related
courses

549

graduates
of IT-related
courses and majors

level 1 courses   level 2 courses

84   **112**

academic year 2015/2016

WROCLAW UNIVERSITY OF ECONOMICS

Uniwersytet Ekonomiczny we Wrocławiu

Wroclaw University of Economics is a major research centre in the field of economic sciences and management sciences, and one of the largest business schools in the country.
EU students are educated at 4 faculties: Management, Computer Science and Finance, Economic Sciences, Engineering and Economics as well at the Faculty of Economics, Management and Tourism.
Under the Faculties, they have a choice of 11 courses in Polish and 3 in English.

IT-related courses and majors

Business and Computing	Course in Polish: • At undergraduate level: Information systems in large corporations (this major will not be available for recruitment students: 2016/2017), Information Technology in Finance (this major will not be available for recruitment students: 2016/2017), Analysis and systems design, database and mobile application technologies, IT in services and administration. • At undergraduate studies: Big Data in business, E-services and e-business, Information systems manager.
Business Informatics	Course in English. At post-bachelor level (only): Corporate MIS, Database Technologies and Mobile Applications, System Analysis and Design.
Information technology and econometrics	In the academic year 2015/2016, there is no recruitment any more, there are only sophomore course students at universities.
Cyber Security Management	Co-organized by IBM – Postgraduate course (offered in academic year 2015/2016) by the Institute of Business Informatics. The Institute of Business Informatics is developing two new postgraduate courses at the Faculty of Management, Information Systems and Finance.

Training program

Programming languages	Two basic ones i.e. C# (subject: Programming) and Java (subject: Advanced Programming) However, in the context of different subjects, other languages are being introduced, related to databases and data analysis, such as SQL, R.
Advanced technologies	• Elements of natural language processing as part of the subjects "Sztuczna inteligencja" (also available in English Artificial Intelligence) • Subjects related to big data at level 2 courses, i.e. in the principal subjects Big data in the first semester (i.e. for all students of Business and Computing) and then from the second semester on, as part of the major: Big data in business.
Algorithmics	Issues related to algorithmics are discussed fragmentarily as part of certain subjects.
Programming paradigms	Object-oriented, functional, logical/declarative and imperative programming.
Option to acquire certificates from software vendors	• For SQL (basic level) affiliated by IBM and Oracle; • Optima Księga Handlowa, Optima szybki start z programem w firmie handlowej, Optima Płace i Kadry, Optima Księga Podatkowa – affiliated by Comarch.
Soft skills	As part of subjects in fields such as systems modelling and design, and management of IT project execution, in joint work execution, students improve their communication and cooperation in practice, executing IT projects together.
Language classes	In level 1 courses, for three semesters the students have (mandatory): English and any other foreign language. In level 2 courses, for two semesters: professional English.
Classes in foreign languages	In full-time level 1 courses "Business Informatics" is taught entirely in English.

Traineeships and internships	In order to complete the fourth semester in full-time level 1 courses, a mandatory 4-week traineeship is required. The internships are paid or free – depending on the agreement between the student and the employer. There are internship opportunities abroad as part of the Erasmus program.

Forms of support for students /employers in establishing relationships (internships / traineeships / employment)

• The University has a career and professional promotion office in place, with its own website. It publishes a lot of useful information for students there (http://www.biurokarier.Wroclaw.pl/).
• Twice a year, there job fairs at the college: "Meetings with the Employer," and throughout the academic year, company presentations and recruitment meetings.
• Information on traineeships is also communicated to students in the classes (including the diploma seminar).
• Individual companies hold workshops for students, e.g., IBM has already organized extra classes twice, with the prize for the best being a job offer.

Cooperation with the business environment

Cooperation with the ICT industry happens in the following areas:
• execution of research projects,
• assistance with implementation of subjects including sharing programs/systems,
• participation in teaching subjects, organizing and implementing postgraduate courses.

Currently, the university cooperates with the following companies: Oracle, SAS, SAP, IBM branches Wroclaw, Warsaw and New York (this distinction is important), VOLVO IT, Comarch, IT Integro, ArtSytems, LogicalTrust, Bilander Group, Capgemini Poland, UNIT 4 TETA BI Center. As part of the postgraduate courses for students, classes are taught by representatives from IBM Wroclaw, Volvo IT, ArtSytems and LogicalTrust among others.

Contact person for business / University contact details

Uniwersytet Ekonomiczny we Wroclawiu ul. Komandorska 118-120 53-345 Wroclaw	• As part of the postgraduate courses for students, classes are taught by representatives from IBM Wroclaw, Volvo IT, ArtSytems and LogicalTrust among others. Helena Dudycz PhD, UE professor (course supervisor for: Business and Computing); • Maja Leszczyńska, PhD (responsible for relations with course shareholders: Business and Computing); • As part of the postgraduate courses for students, classes are taught by representatives from IBM Wroclaw, Volvo IT, ArtSytems and LogicalTrust among others. Mieczysław Owoc, Business professor (course supervisor for: Informatics professor).

overall

students

graduates

681

212

students in IT-related courses

442
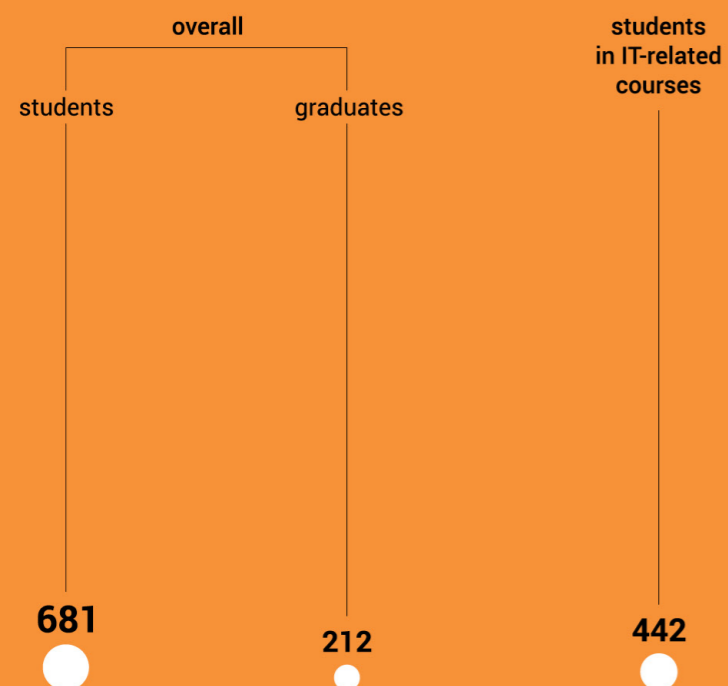
2015, academic year 2015/2016

HIGHER SCHOOL OF INFORMATION TECHNOLOGY AND MANAGEMENT "COPERNICUS"

Wyższa Szkoła Informatyki i Zarządzania Copernicus we Wrocławiu

The School offers education in the field of physiotherapy, information technology and administration, as well as other sciences which develop and improve skills required in professional work.

The School's offer includes level 1 and 2 courses, post-graduate courses, as well as certifications and courses. WSIiZ Copernicus has a CISCO Local Academy in place.

IT-related courses and majors

• Computer Networks
• Information Systems Engineering
Planned: Designing Embedded Systems

Training program

Programming languages	C#, C++, Java, ASP.NET, TSQL.
Advanced technologies	Cryptography, big data, artificial intelligence.
Algorithmics	Probabilistic algorithms, distributed.
Programming paradigms	Object-oriented programming.
Option to acquire certificates from software vendors	The curriculum includes preparation for obtaining MCSD certificates.
Option to acquire certificates in administration / security	The curriculum offers preparation for obtaining MCSA certificates.
Option to acquire certificates in the field of modelling / analysis / testing	The curriculum includes preparation for obtaining ISTQB certificates.
Option to acquire certificates in project management	The curriculum includes preparation for obtaining PRINCE certificates.
Soft skills	Team-based programming, execution of group network projects.
Language classes	English.
Traineeships and internships	The program includes mandatory traineeships/internships. In most cases these are placements, paid traineeships.

Forms of support for students /employers in establishing relationships (internships / traineeships / employment)

The College has a career office in place. The College organizes job fairs and other events; details are posted at the career office website.
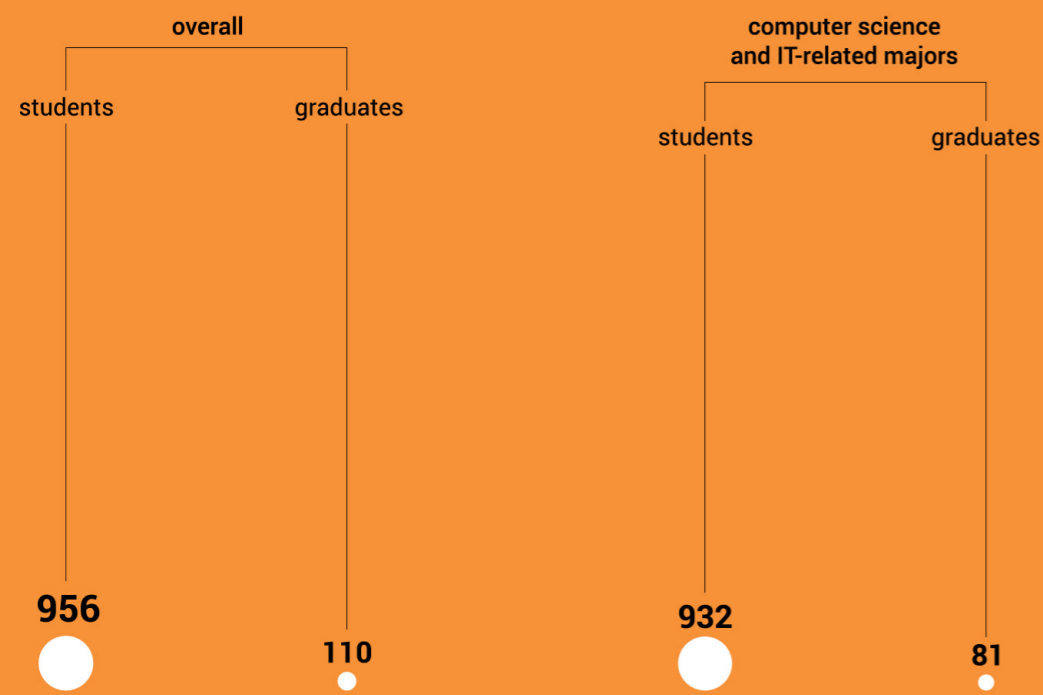
Cooperation with the business environment

The College cooperates with the following companies: Volvo, IBM, Luxsoft, Credit Suisse, Microsoft, Cisco. The cooperation includes guest lectures, access to materials and teaching base.

Contact person for business / University contact details

Wyższa Szkoła Informatyki i Zarządzania „Copernicus" we Wroclawiu
Address: ul. InoWroclawska 56,
53-648 Wroclaw

The cooperation includes guest lectures, access to materials and teaching base. Bartosz Majorowski, MSc Eng, bartosz@wsiz.wroc.pl, +48603852466

overall

students — graduates

956

110

computer science
and IT-related majors

students — graduates

932

81

year 2015/2016

HIGHER SCHOOL OF APPLIED INFORMATION TECHNOLOGY "HORIZON"

@HORYZONT
WROCŁAWSKA WYŻSZA SZKOŁA
INFORMATYKI STOSOWANEJ

Higher School of Applied Information Technology "Horizon" offers level 1 courses in computer science degree (BSc, BA) and level 2 courses (MA) in full-time and distance learning modes. The college has a CISCO Local Academy in place.

IT-related courses and majors

Computer science	**Level 1 courses** – engineering and undergraduate. Majors: Computer network administrator, Computer graphics, Web design, Computer systems security, Programming, Databases, Computer science in logistics, Information technologies in automation and robotics.
Computer science	**Level 2 courses** – continuation for master's degree) Majors: Computer graphics, Sieci Komputerowe i Systemy Teleinformatyczne, Programowanie.
Automation and Robotics	Majors: Mobile robots, Information technologies in automation.

Training program

Programming languages	Java, C++, SQL, PHP, JavaScript, Matlab.
Advanced technologies	Cryptography, Big data, Mobile devices programming.
Algorithmics	Numerical, probabilistic, distributed, approximate algorithms.
Programming paradigms	Object-oriented, imperative, functional, structural programming.
Option to acquire certificates in administration / security	CCNA, CCNA Security, Fluke networks.
Soft skills	Communication, collaboration, teamwork.
Language classes	English.
Traineeships and internships	The internships are paid or free – depending on the agreement between the student and the employer. The Erasmus+ program offers internship opportunities abroad.

Forms of support for students /employers in establishing relationships (internships / traineeships / employment)

• The career office assists students in finding job offers; the college posts notices on the web and informs students about the possibilities through bulletin boards.
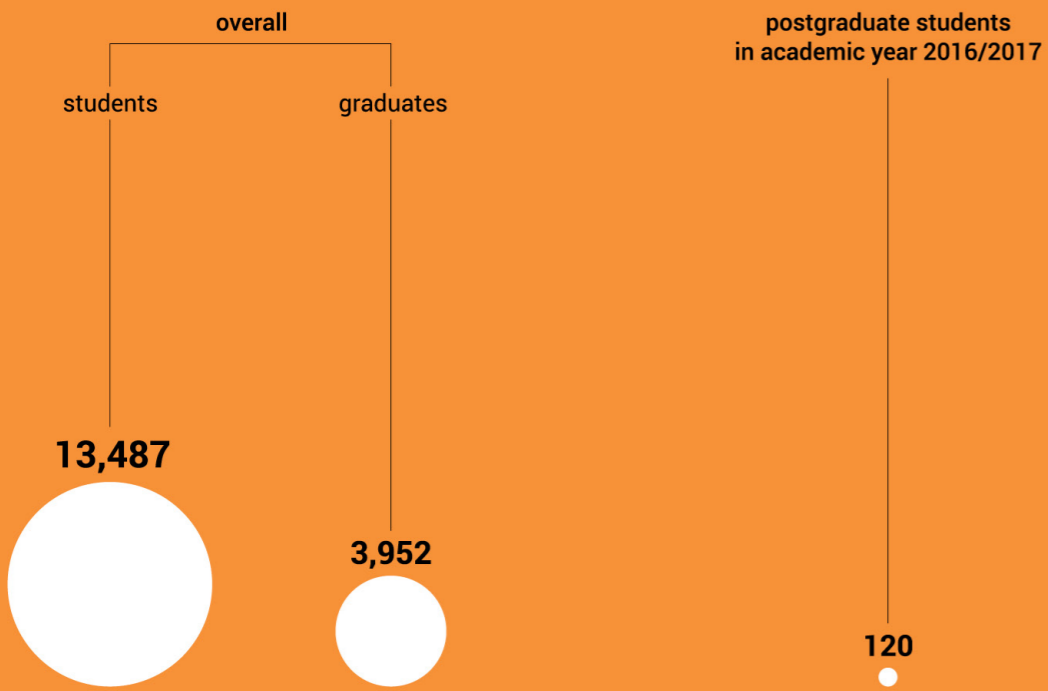• Organized at the college are open lectures and workshops held by companies.

Cooperation with the business environment

• Form of cooperation: open lectures, traineeships/internships, work on EU-funded projects, support in the scientific development of units, support from businesses for the development of course curricula and execution of selected subjects, assistance in completion of theses, graduates' career tracking.
• The college's co-operators include: IBM, Volvo, HP, Nokia, Capgemini, Dolby, DIEHL Controls, Techland, Indata Software SA, Yumasoft, HICRON, Unit4, DeLaval, NeuroSYS Sp. z o.o.

People to contact for business

Biuro Karier WWSIS ul. Wejherowska 28 54-239 Wroclaw		Phone 0-71 799 19 37 (ext. 33) Fax 0-71 799 19 37 e-mail: kariera@horyzont.eu www.horyzont.eu

Statistics

overall

students   graduates

13,487

3,952

**postgraduate students
in academic year 2016/2017**

120

year 2015

HIGHER BANKING SCHOOL IN WROCLAW

Wyższa Szkoła Bankowa we Wrocławiu

Higher Banking School was established in 2005. It is the largest private college in Lower Silesia. WSB's offer includes level 1 courses (BSc, BA), level 2 courses (continuation for MA), postgraduate and MBA courses, as well as courses and training, including language training.

IT-related courses and majors

Post-graduate courses	• Software engineering for SAP ERP and ABAP programming • Integrated SAP ERP IT System • IT project management, • Requirements management and business analysis Undergraduate computer science courses are planned (two majors: IT systems analyst and web solutions expert) as well as Management Engineering (engineer, with IT project management engineering major), and for postgraduate courses, the following majors: • Business intelligence in ERP (SAP, ComarchXL) • Software tester for mobile and server applications

Training program

Programming languages	Postgraduate courses: ABAP, SQL, OpenSQL, MDX and software tester: Python (main), also discussed: Ansible, Terraform.
Option to acquire certificates from software vendors	SAP certificate covering postgraduate SAP course topics.
Option to acquire certificates in the field of modelling / analysis / testing	In the postgraduate courses, we prepare students on testing to take exams for: ISTQB. The curriculum also helps prepare for CCBA, CBAP and PBA. These are modeling / analytics certificates.
Option to acquire certificates in project management	Postgraduate courses: the program also helps prepare for PMP, CAPM CSM, PSM, PRINCE2, IPMA-D and C.
Soft skills	A section of the postgraduate tester course includes: professionalism in the IT industry, communication in IT projects as well as public presentations and assertiveness. Additionally: • Cascading and agile project management, process and agile requirement gathering. • Difficult situations in projects. • Creating a project organization
Language classes	Full-time study: English, German, Spanish, Russian The programs are adapted to the courses. Part-time study: English, German, Spanish, French (and optionally on the Rosetta Stone platform: Dutch, Italian, Chinese).
Classes in foreign languages	English language track study.
Traineeships and internships	The curriculum includes a mandatory 12-week traineeship. By default, traineeships are unpaid. Paid traineeships and internships are possible under EU subsidized projects (competitions), but it is not a measure executed in a continuous system. As part of the Erasmus program, WSB Wroclaw students have the option of doing traineeships and internships abroad.

Forms of support for students /employers in establishing relationships (internships / traineeships / employment)

• Career office staff source traineeship offers for students. There is an electronic internship/traineeships/work agency system available for them and the students.
• Once a year, there are Job Fairs at the College.

Other actions include:
• Mentoring for students and graduates – a mentoring program run by employees of companies
• Program GPS – Gdzie po studiach – Pracuj w ... (company presentations)
• Organization of study visits in companies
• The program "Praktyki w biznesie" (while working in teams under the supervision of a College employee and a company employee, students prepare solutions for companies.

## Cooperation with the business environment

The College has been working mainly with international corporations, banks and companies. Employees of these companies teach or share the teaching of classes, e.g.:
• Program CRC – Service Management (15 hours lab workshop)
• Inviting business representatives to lectures during classes.

Contact person for business / University contact details

Wyższa Szkoła Bankowa we Wrocławiu
ul. Fabryczna 29-31
53-609 Wrocław

students   graduates

2,835

1,272
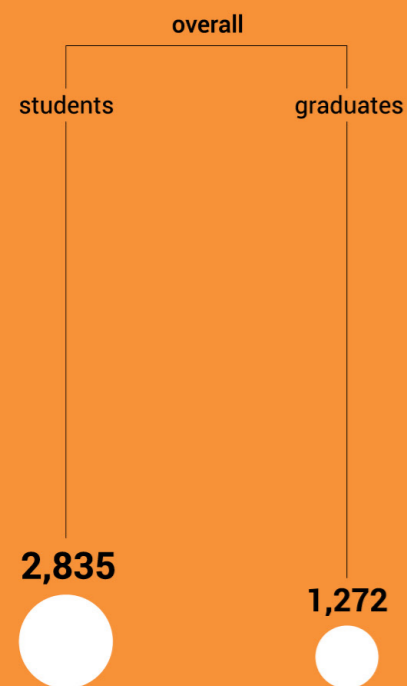
year 2015

UNIVERSITY OF LOWER SILESIA IN WROCLAW

Dolnośląska Szkoła Wyższa

www.dsw.edu.pl

The University of Lower Silesia was established in 1997. The University offers education in level 1 and level 2 courses and doctoral courses, in the field of educational sciences, social sciences and journalism and technical sciences. In 2016, the University of Lower Silesia ranked 1st in Lower Silesia out of private universities in a ranking compiled by the Perspektywy monthly.

1. FACULTY OF TECHNICAL SCIENCES

65 students in geoinformatics   **90** geoinformatics graduates

IT-related courses and majors

• Geoinformatics as part of the Geodesy and cartography course

Planned: Computer Science. Majors: Designing information systems and data analysis and IT project management.

Training program

Programming languages	JAVA, C++, SQL, XML, HTML, PHP, Linux shell scripting.
Advanced technologies	Artificial intelligence, Big Data, data collection and mining methods, neural networks, distributed systems.
Algorithmics	Artificial intelligence, neural networks, distributed systems, genetic algorithms.
Programming paradigms	Object-oriented programming, concurrent programming.
Option to acquire certificates from software vendors	Items included in the curriculum constitute preparation for ORACLE certification exams: • Oracle Certified Expert Java EE 6 Web Component Developer • Oracle Certified Expert Java EE 6 Web Services Developer • The University is not an examination centre.
Option to acquire certificates in administration / security	Items included in the curriculum constitute preparation for ORACLE certification exams: • Oracle Database SQL Certified Expert. The University is not an examination centre.
Option to acquire certificates in project management	Items provided for in the curriculum constitute preparation for the following certification exams: Scrum Master, Prince2. The University is not an examination centre.
Soft skills	The program includes the major IT project management; the students will acquire competence in the field of resource management, knowledge management, risk management, planning, tasks allocation, reporting and scheduling.
Language classes	English or any other modern language. A condition for graduation is an internal exam proving language proficiency at level B2. Language classes focus on industry language skills: Technical English
Traineeships and internships	The internships take 3 months, are unpaid. The University provides internships in Poland. Internships abroad are available under the ERASMUS program.

Forms of support for students /employers in establishing relationships (internships / traineeships / employment)

The University provides internship locations provided for in the curriculum. It has a careers office which organizes a Job Fair, Career days and other such events and projects.

Cooperation with the business environment

When designing the course Geoinformatics, the University invited the following companies to cooperate:
Softline. Rec Global Creative Engineering, Smart Solutions Consulting, Idaga Smart Solutions, Idaga Janusz Sołtysik. Representatives of these companies gave their opinions on the Computer Science course curriculum. The companies also declared their willingness to take students for placements. Moreover, employees of these companies will be teaching. Half of the minimum staff are people with practical experience gained outside the university.

Person to contact with your business

Dolnośląska Szkoła Wyższa ul. Wagonowa 9 53-609 Wroclaw e-mail: sekretariat@dsw.edu.pl	Malgorzata Pietras-Szewczyk, PhD malgorzata.pietras@dsw.edu.pl

2. FACULTY OF SOCIAL SCIENCES AND JOURNALISM

30 students of 3D animation and special effects in the media   **25** graduates of 3D animation and special effects in the media

IT-related courses and majors

Creative media	Game design, animation, special effects. Major: 3d Animation and special effects in the media as part of the Journalism and Social Communication course Planned: Media design and marketing.

Training program

Programming languages	Html, Java, C++
Advanced technologies	Operating motion capture systems.
Programming paradigms	Object-oriented programming.
Soft skills	Communications in group.
Language classes	English.
Traineeships and internships	100 hours in the course of the study, internships and traineeships are free.

Forms of support for students /employers in establishing relationships (internships / traineeships / employment)

Agency in finding traineeships, additional internship and traineeship offer at the Career Office, internships funded by EU programmes.

Cooperation with the business environment

The College cooperates with the following companies: Dash Dot Creations, Grupa MY, Tequila Games, Techland.
Forms of cooperation with business: traineeships, guest lectures, teaching regular classes, joint scientific research.
Classes with students are taught by representatives of the following companies: Dash Dot Creations, Grupa MY i Tequila Games.

Contact person for business / University contact details

Dolnośląska Szkoła Wyższa
ul. Wagonowa 9
53-609 Wroclaw
e-mail: sekretariat@dsw.edu.pl

students   graduates

709   **377**
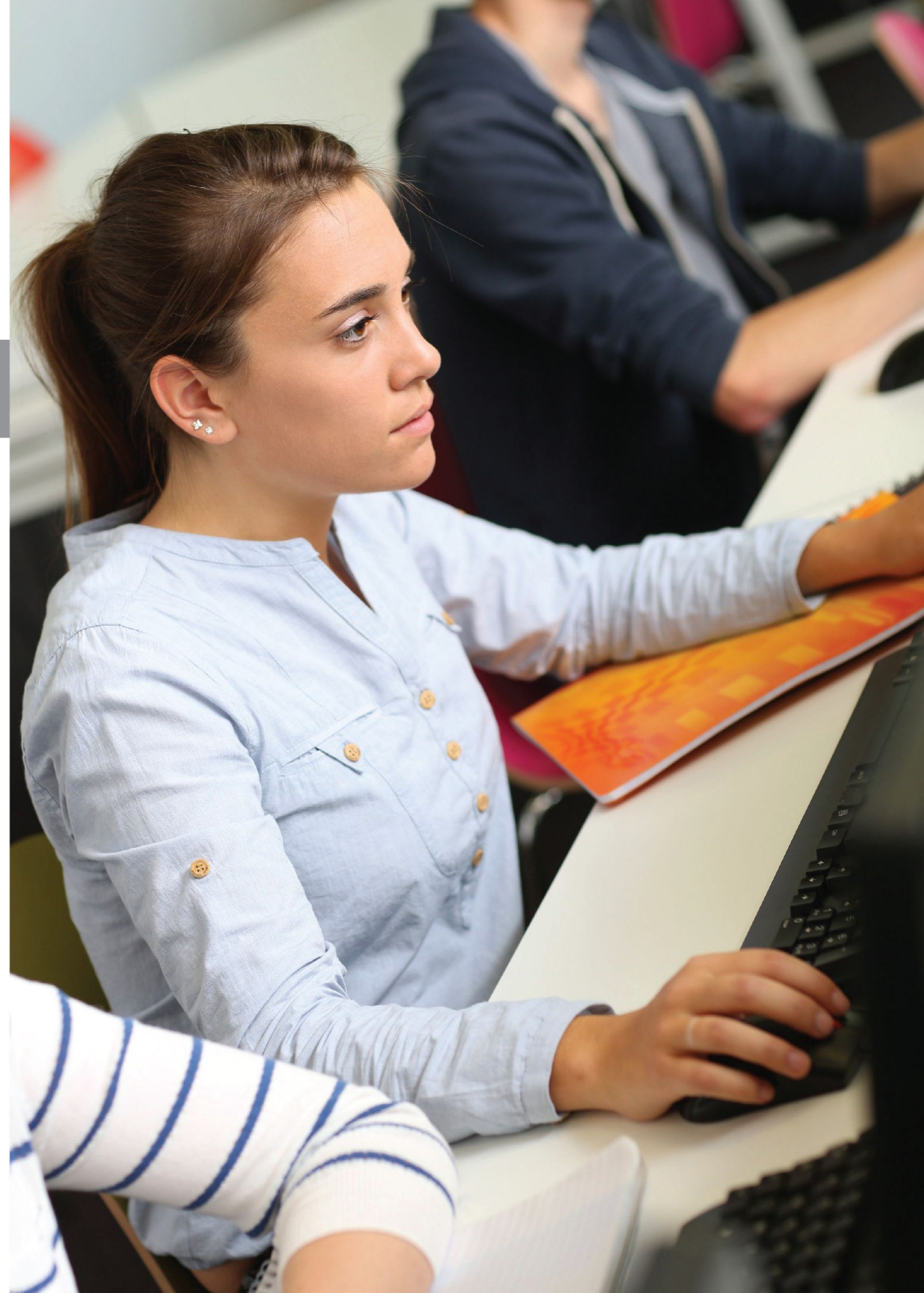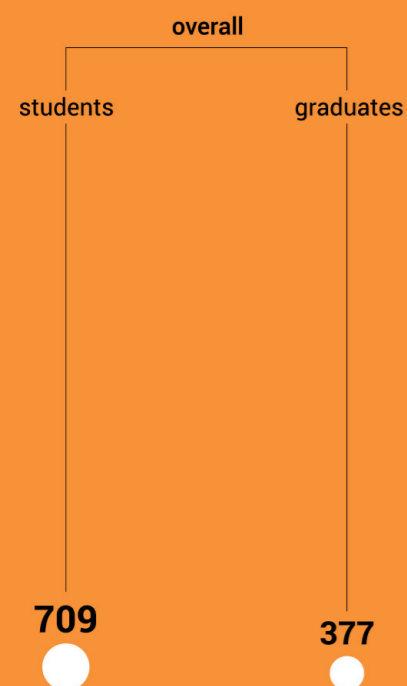
year 2015/2016

UNIVERSITY OF BUSINESS IN WROCLAW

Wyższa Szkoła Handlowa we Wrocławiu
University of Business in Wroclaw

University of Business in Wroclaw is a private non-public academy with a business profile. It offers level 1 and level 2 courses in economic sciences and humanities, as well as postgraduate courses, including MBA, carried out in cooperation with business partners. In October, 2016, a new course will launch: Computer Science. There are plans for further technical courses.

IT-related courses and majors

Computer Science	Level 1 course, practical profile Majors: Internet and multimedia technologies; Computer network security. Planned: Project management based on the Agile method; 3D Graphics.

Training program

Programming languages	Java, JavaScript, C++, PHP.
Advanced technologies	Cryptography, Big data, Advanced probability calculus.
Algorithmics	Probabilistic, serial, parallel, interactive and recursive algorithms.
Programming paradigms	Object-oriented.
Option to acquire certificates from software vendors	Most likely, it will be a corporate readiness certificate issued by IBM.
Option to acquire certificates in project management	Most likely PMI.
Soft skills	Yes.
Language classes	English and German.
Classes in foreign languages	Most likely, part of the classes will be taught in English.
Traineeships and internships	450 hours of traineeships, on average, 150 h per year. Depending on the employer, the traineeships are paid or unpaid. There are internship/traineeship opportunities abroad.

Forms of support for students /employers in establishing relationships (internships / traineeships / employment)

• Akademickie Biuro Karier Hermes
• Job Fair organized once a year.

Cooperation with the business environment

• Cooperation with companies: IBM, SMT Sowfware, REC Global.
• Signed official cooperation agreements for curriculum consultation, teaching and accepting students for internships.

Contact person for business / University contact details

Wyższa Szkoła Handlowa we Wrocławiu ul. Ostrowskiego 22 53-238 Wroclaw	Artur Tomys: artur.tomys@handlowa.eu

students

graduates

students
in IT-related courses
and majors (approx.)

2289

423

400
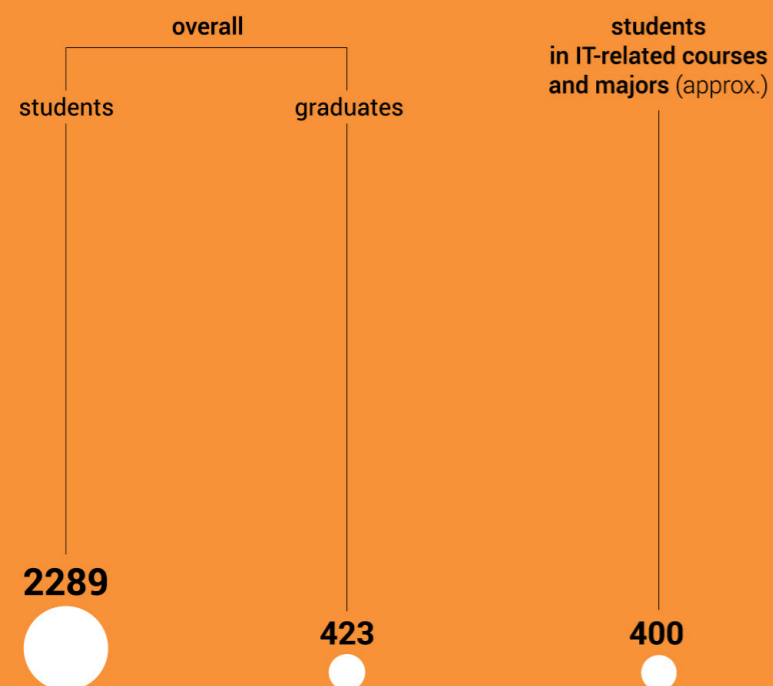
academic year 2015/2016

SWPS UNIVERSITY – CAMPUS WROCLAW

UNIWERSYTET
SWPS
WROCŁAW

SWPS University is Poland's first non-public university, which educates a total of over 16,450 students in its campuses in Warsaw, Wroclaw, Poznań, Katowice, Sopot and. The SWPS offering is 30 courses of study – level 1, 2 and 3, and uniform MA courses. The Wroclaw Campus operates an graphics institute, a journalism and social communication institute, a humanities department and 5 standalone departments for various areas of psychology.

IT-related courses and majors

- Graphics
- Journalism and social communication
- Visual communication
- Media creation
- Man-technology interaction design (a major in Psychology)
- User Experience Design (postgraduate course)

Training program

Programming languages	HTML / CSS / Latex / Flash.
Soft skills	Modules on the development of personal skills and social skills (2 x 30 teaching hours in the first year and 1 x 30 hours in the second year). social communication, teamwork, creative attitude, critical and analytical thinking, impression management, public speaking, team management, personal branding.
Language classes	English.
Classes in foreign languages	Psychology classes in English in elective offer.
Traineeships and internships	Mandatory traineeships delivered as part of the curriculum. Students are not paid. Additionally, internships are offered organized by career office and funded under European projects (may be paid).

Forms of support for students /employers in establishing relationships (internships / traineeships / employment)

Career office offering, involvement of course tutors and directors, SWPS Virtual Job Fair (in 2015, 27 exhibitors), workshops by SWPS lecturers during Absolvent Talent Days.

Cooperation with the business environment

The school cooperates with Divante, as well as with creative, design, PR and advertising agencies. The companies deliver classes and give opinion on an Internet marketing module curriculum. Together with the business environment, the university delivers projects, including EU projects. Students go for traineeships and internships at the companies.

Contact person for business / University contact details

SWPS – Oddział Zamiejscowy we Wroclawiu
ul. Ostrowskiego 30 b,
53-238 Wroclaw

Karina Stasiuk-Krajewska, PhD
kstasiuk-krajewska@swps.edu.pl
Mariusz Wszołek, PhD
mwszolek@swps.edu.pl

THE UNIVERSITIES'
EXPECTATIONS OF BUSINESS

Increased participation in scientific and research projects, greater involvement in shaping the educational offering through internships/traineeships delivered, support in renewing the laboratory base, cooperation at curriculum level.

Clearer formulation of what is required of our graduates.

Information about new technologies, joint ventures, exchange of experience in the design of information systems, review of curricula.

As part of a consortium, delivering research and development projects, cooperation in taking people on doctoral studies for (paid) internships, with scopes related to the subject/area of the doctoral dissertations; support for the delivery of subjects, e.g. through sharing (free of charge or at very favourable financial terms – educational versions possible) programs/systems, co-teaching subjects, where the latest innovations in the ICT area can be presented; co-organizing postgraduate courses; recruiting students for placements internships linked to their pursued theses.

Intensified cooperation in the R&D area.

Investment in equipment, scholarships for outstanding students, paid internships and traineeships.

Professional lectures on specific technologies, student internships and traineeships, talking about INNOVATIVE ideas implemented by the business environment that encourage students to improve their knowledge and show what it is worth learning. We like it when companies tell us about some technologies (even not necessarily innovative, but ones we find difficult to talk about because we do not know them).

Optimizing the curricula for optimum adaptation of graduates' qualifications to market needs.

Involvement in the education process through evaluation of the curriculum – advisory role.

Participation in the delivery of classes, taking students for traineeships and internships, hiring graduates, consultation on curriculum, organization of study visits at companies.

ABOUT THE AUTHORS

Joanna KOTZIAN
Manager – Employer Branding, HRK S.A.
Joanna manages the Employer Branding Team in HRK S.A. She conducts brand image research projects, including EVP identification; she creates and implements brand image strategies for large Polish and multinational companies, supports communication process during organisational changes and deals with building employee involvement as well as implementation of diversity management programmes. Within Bernard Hodes Global Network, she cooperates with employer branding experts all over the world.
Joanna.Kotzian@hrk.eu

Łukasz CZAJKOWSKI
Director of Business Support Center, Wroclaw Agglomeration Development Agency (ARAW)
Since joining ARAW in November 2014, Łukasz leads the investment promotion team of the Wroclaw Agglomeration, which is responsible for the facilitation of investment projects of multinational companies, from industrial and business services sectors. Supporting the process of negotiations between investing companies and local/regional authorities. Planning and managing long term initiatives related to post-investment care, facilitation of international expansion of Polish companies and clustering, including Creativro – creative industries.
Lukasz.Czajkowski@araw.pl

Patryk CHRZAN
Regional Manager, HRK Wroclaw
A graduate of International Relations at the University of Wroclaw. He has over 8 years of professional experience, mostly gained while working in the area of HR consulting and advanced solutions in BPO industry.
He worked in managerial positions in companies with Polish, German and Dutch capital. In HRK S.A. responsible for the development of the Lower Silesia market and supervision and delivery of ongoing recruitment projects. He carried out numerous projects in the field of recruitment for specialist and managerial positions for customers in the e-Commerce, TSL and manufacturing industry.
Patryk.Chrzan@hrk.eu

Monika ANTCZAK
Business Unit Manager ICT, HRK S.A..
Graduate of sociology and law at the University of Białystok, fellow of University Tsukuba, Japan. She has 9 years' experience in the recruitment industry. Previously, she worked a recruitment company Antal International (IT/Telecom team) as a Team Leader, where she executed recruitment projects for IT companies, financial institutions, the FMCG sector and manufacturing. In the HRK Group, she performs the function of the ICT Unit Manager, looking for the best solutions, experts and talents in the field of IT technology. She specializes in the execution of recruitment processes for expert (technical) and senior management positions.
Monika.Antczak@hrk.eu

RESEARCH PARTNERS

HRK S.A.
HRK is one of the major consulting organizations as regards HR management in Poland. Since 2000 we have been supporting managers in winning employees and effective staff management. We offer projects related to recruitment, research and development of professional potential (including advanced Assessment/Development Centre study), building career paths, employer branding and - under the business name of HRK Payroll Consulting – remuneration management and managing personnel documentation. We carry out projects across the country as well as abroad.
More: *www.hrk.pl*

ARAW S.A.
Wroclaw Agglomeration Development Agency is a city-owned company established for supporting FDI – Foreign Direct Investment in the area of Wroclaw. ARAW is responsible for investment promotion, and thus constitutes an interface between the investor and their regional agents: local authorities, real estate owners and representatives, recruitment agencies, special economic zones, supply chain partners, business supporting institutions, etc. ARAW offers continuous support to international investors and domestic companies that are interested in further development and identification with the region and a local community.
More: *www.araw.pl, www.invest-in-Wroclaw.pl*

BUSINESS GARDEN
natural space for business

Business Garden Warszawa
Phase II completion 1Q 2017
5 office buildings, 56 000 m²

Business Garden Poznan
Phase I completed
4 office buildings, 42 000 m²

Business Garden Wroclaw
Phase I completion 4Q 2016
3 office buildings, 37 000 m²

Business Garden is an innovative concept of office centers. Combining a mixture of efficient offices with easy transport connections as well as exceptional amenities, Business Garden complexes offer inspiring and environmentally-friendly workplaces.

To let call
+48 22 370 14 44

More information:
www.businessgarden.pl

Project by VASTINT