

## Title

Applied Data Science & Artificial Intelligence

## General Information

**Cost**

1150 euro

**Delivery Method**

Online time

**Hours**

6pm to 9pm

**Duration**

3 months

**Maximum number of participants**

20

**Starting date**

10/12/2020

**Program Manager**

Dr. Anastasios Drosou

## Contents

Introduction in Data Science & AI basics (1 week)

Applied Data Science & Intro in RPA (3 weeks)

- Data manipulation & statistical processing
- Data storage & visualization
- Project Management
- Robotic Process Automation

Machine Learning & Artificial Intelligence (5 weeks)

- Machine Learning I
- Machine Learning II
- Deep Learning I
- Deep Learning II

Deployment Automation (2 weeks)

- Kubernetes, VMs & Dockers

Thesis / Project (2 weeks)

## Overview

The topics to be learned throughout the 3-months duration of the educational program cover complete developmental pipeline of software solutions that are needed to solve demanding industrial & day2day problems of the modern SMEs and/or industry with AI-related technologies. Starting from the problem's identification & its breakdown in smaller stand-alone tasks, focusing on the utilization of modern Data Science & AI technologies for the development of the effective algorithms and finally, addressing even the efficient wrap-up of the SW module & its seamless integration in the overall solution, this program means to offer the knowledge and the hands-on experience for building up the appropriate skills for modern developer, analysts, etc.

In particular, without lacking in depth and detail, the curriculum spans over a wide range of topics, like breaking down of a project to the distinct steps, task & technologies, Robotic Process Automation approaches, applications & technologies, Statistical methods for data analysis, Data minimization, storage & visualization, Machine Learning classification, Deep Neural Networks & further AI practical problems, Reinforcement Learning, while it concludes with widely used Deployment Automation approaches, like dockers & microservices.



## Scope & Subject

The scope of the program is:

- to bridge the gap between the theoretical knowledge offered in the universities with hands-on experiences from real industrial problems
- to build up the analytical skills of the students in the way they approach day2day or longer problems of algorithmic nature.
- to offer the skills on implementing these approaches through modern technologies on AI and Data Science
- to familiarize them with the most widely adapted & used tools nowadays (e.g. Python, Dockers, RPA, etc.)
- to demonstrate & teach the optimized usage of both certain AI/ML & data manipulation libraries in Python
- to bring them in contact with industrial stakeholders in the region of Northern Greece
- to help them boost their career perspectives by rendering them more desired candidates for the majority of the vacancies in the domain.

The target group of this course are graduates and/or professionals with basic or moderate knowledge in the domain of Information-Communication Technologies, who want to acquire a deeper hands-on experience on the state-of-the art tools that are currently used in the software engineering industry, mainly focusing on the Data Science & the massively expanding Artificial Intelligence area.

In this respect, the current program aims to provide not only with a theoretical background, but most significantly with an in-depth hands-on experience on the technologies and the tools that are used throughout the developmental pipeline of software production that utilizes AI-related algorithms & technologies.

At the end of the course, the students will be brought in contact with one of the Cluster's affiliated companies and will be assigned with a short project to carry out as part of their studies.

## Key words of the training program

Artificial Intelligence, Deep Neural Networks, Machine Learning, Robotic Process Automation, Statistical Approaches, Data Management & Manipulation, Micro-services, Dockerization, Deployment Automation, Project Management basics.

## Participant profile

IT background  
Basic knowledge of Python programming language  
Basic knowledge of DBs programming  
Analytical way of thinking

## Benefits for the Trainee

Hands-on experience on state-of-the art tools, currently used in the software engineering industry of Data Sciences & Artificial Intelligence

Assignment of existing project owned by a company, member of the Technopolis AI Cluster

Short term training course delivered on non-working hours, 3 days the week

Focused approach

Knowledge transfer from the field experts; tutors of the program will be Researchers and Field Engineers able to point out the real market needs

## Target Group

Companies that wish to upskill their technical personnel on field practices, on the latest tools and methodologies of the SW engineering industry  
We undertake the critical task of preparing their personnel in a short time period, by guiding them to the difficulties and the tricks of the SW tools, and preparing them on real projects.

Individual graduates and/or professionals with basic or moderate knowledge in the domain of Information-Communication Technologies, who want to acquire a deeper hands-on experience on the state-of-the art tools that are currently used in the software engineering industry, mainly focusing on the Data Science & the massively expanding Artificial Intelligence area.

## TUTORS

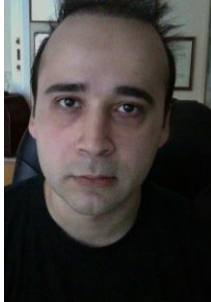


**Dr. Ioannis Vlahavas** is a professor at the Department of Informatics at the Aristotle University of Thessaloniki. He received his Ph.D. degree in Logic Programming Systems from the same University in 1988. He has been a visiting scholar at the Department of CS at Purdue University and in 2017 elected EurAI Fellow from the European Association for Artificial Intelligence. He specializes in knowledge based and AI (machine learning) systems and he has published over 330 papers and book chapters, and co-authored 9 books in these areas. Google scholar gives a number more than 13.800 citations and an h-index of 52. He teaches AI, Machine learning, and DSS. He has successfully supervised 15 PhD students. He has been involved in more than 40 research and development projects, leading most of them. He was the chairman or program committee member of numerous AI related conferences and/or workshops. He was Chairman of the Dept. of Informatics at the Aristotle Univ. of Thessaloniki, Greece (2013-2017) and Member of the steering committee and Dean of the School of Science and Technology of the International Hellenic University (2007-2016). He is currently leading the Intelligent Systems Lab.

More information at: <https://intelligence.csd.auth.gr/people/vlahavas>



**Dr. Anastasios Drosou (male)** is a computer engineer and a senior researcher (**Researcher Grade C'**) at Centre for Research and Technologies Hellas/ Information Technologies Institute (CERTH/ITI). He received his Diploma in Electrical and Computer Engineering, from Aristotle University of Thessaloniki, and his MSc. in Communication Electronics from the Technische Universität München in 2004 in 2007, respectively. He also holds a PhD in Signal and Image processing from Imperial College London since 2013. He has been involved in numerous European and National research projects, both in management but also in R&D activities. His research interests are in the field of machine learning & artificial intelligence, data & visual analytics, for applications on computer vision, AR & VR, signal & image processing, pattern recognition, network security, etc. He is the **co-author of more than 90 scientific papers** (journals, conferences and book chapters). He serves as a lecturer in the MSc. Program of Electrical and Computer Engineering, from Aristotle University of Thessaloniki. In the past, he has worked for Infineon Technologies AG Munich (2006-2007), as well as for the Chair for Electronic Design Automation (2007) & the Chair for Nanotechnology (2006) in the Technische Universität München. Moreover, he has worked as a Research Associate for CERTH-ITI (since 2005) and the Art Diagnosis Centre "ORMYLIA" 2004-2005). He is a member of the Technical Chamber of Greece.



**Dr Anastasios Alexiadis** is a computer scientist and a Research Fellow of the Information Technologies Institute of the Centre of Research and Technology-Hellas. He received his Bachelor degree in Computer Science from Brunel University London and holds two Master titles with Distinction (one in Intelligent Systems from the University of Sunderland and one from the University of Macedonia in Thessaloniki, Greece). He received his PhD from the University of Macedonia in the field of Artificial Intelligence. His research interests lie in the fields of Artificial Intelligence and Machine Learning, Optimization, Cryptography and Computer Languages. He has participated in a number of National and European projects and has authored or co-authored more than 25 publications.



**Dr. Anastasios Vafeiadis** received the Bachelor of Science in Electrical & Computer Engineering from Worcester Polytechnic Institute, Worcester, MA in 2012. He received the Master of Science in Electrical & Computer Engineering from Northeastern University, Boston in 2014. He received the PhD in Computer Science for the thesis, Machine Learning for Human Activity Detection in Smart Homes, as a Marie-Curie fellow, having studied at De Montfort University, Leicester, England. He has worked at Toyota InfoTechnology Center, USA, the Mathworks and as a digital signal processing engineer at Bose Corporation. He has been working as a research assistant at the Information Technologies Institute of CERTH, since October 2016. His research interests include digital signal processing, machine learning, deep learning, acoustics, speech recognition and speech synthesis.



**Dr. Thanasis Vafeiadis** is a post-doctoral research associate in CERTH/ITI since 2015. He received his diploma in Mathematics (2002), master's degree in Statistics and Operations Research (2004) and PhD in Departmental Investigation of Linear Trend in Time Series (2011), by the Department of Mathematics, Faculty of Science A.U.Th.. His main research interests focus on the analysis of linear trend in time series, in statistical and factor analysis, machine learning (supervised and unsupervised), signal processing, deep learning in one-dimensional signal (time series) and two-dimensional input for classification and regression, anomaly detection and fault detection on time series, data analytics for industrial purposes. During his cooperation with CERTH/ITI, he has participated in several European projects related to data analytics and artificial intelligence. Also, he has been the co-author of related publications in conferences and journals and also reviewer in several international journals.



**Dr. Nikolaos Dimitriou** is a post-doctoral research associate in the Information Technologies Institute of CERTH. He received his Diploma in Electrical and Computer Engineering in 2007 and his Ph.D in Motion-based Video Segmentation both from Aristotle University of Thessaloniki (AUTH). From 2009 up to 2013 he worked as a teaching assistant in the same institution for the courses of Computer Systems, Computer Graphics and Multimedia Systems in the department of Electrical and Computer Engineering. He has been involved in various research projects, including AVENUE, Z-Fact0r, Scan4Reco, P-





REACT, VITALAS and ECOBUILDING funded by EC and the Greek Secretariat for Research and Technology. His main research interests are on computer vision and deep learning with a focus on 3D pose estimation, tracking, object segmentation and recognition. He has co-authored 25 papers in peer-reviewed journals and international conferences and serves as a reviewer for various refereed journals including, IEEE Transactions on Image Processing and IEEE Transactions on Industrial Electronics. He is a member of IEEE.



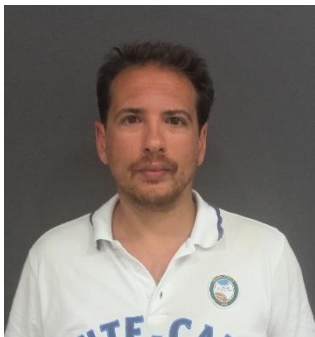
**Giorgos Gerovasilis** graduated from the School of Sciences of Aristotle University of Thessaloniki with the title of Mathematician. He earned a master's degree from the University of Brighton, with the title Internet and distributed systems. He participated in many startups with topics such as 3D interior design, as well as in applications related to health with hI7 technologies. Since 2018 is working as a full stack developer on ITI/CERTH and involved in various research projects, such as DM4All, EasyTV, Activage. His main research interests are on the development of web and desktop applications with focus on health and bioinformatics.



**Dr. Dimitrios Giakoumis** is a Senior Researcher (Grade C') of the Information Technologies Institute of CERTH. He received the Diploma in Electrical and Computer Engineering, the M.Sc. in Advanced Computing and Communication Systems and the Ph.D. in Human – Computer Interaction through Affective Interfaces in 2006, 2008 and 2012 respectively, from the Aristotle University of Thessaloniki, Greece. His main research interests include human-robot interaction, robot vision, service robot perception and cognition, affective computing, human motion, activity and behaviour analysis and modelling, safe and social-aware robot navigation, biosignals processing and sensor management, multimodal interfaces, machine learning and pattern recognition. His involvement in these areas has led to co-authoring of more than 70 papers in refereed journals, international conferences and book chapters. He has served as reviewer for a series of scientific journals, including the IEEE Transactions in Biomedical Engineering, ISA Transactions (Elsevier), Elsevier Computer Methods and Programs in Biomedicine, Computational and Mathematical Methods in Medicine (Hindawi, guest editor of the special issue “Advances in Computational Psychometrics”), the Computer journal (Oxford) and the EURASIP Journal on Advances in Signal Processing, as well as for international conferences. He was a member of the organizing committee (Technical Program Chair) of the 5th International Symposium on Pervasive Computing Paradigms for Mental Health (MindCare 2015), the Workshops Co-Chair at the 5th IEEE Smart World Congress (IEEE SWC 2019) and the General Co-Chair of the 12th International Conference on Computer Vision Systems (ICVS 2019). He is with CERTH-ITI since 2007 and has been involved in several FP6, FP7 and H2020 R&D projects, including ASK-IT, OASIS, ACCESSIBLE, AEGIS, INTERSTRESS, CUBRIK and ACROSSING, as well as in national projects funded by the Greek Secretariat of Research and Technology, including EnNOISIS. He has been the deputy Coordinator and Quality Manager of the Horizon2020 RAMCIP project, the deputy Scientific and Technical Manager of the H2020 HR-RECYCLER and BACCHUS projects, the Quality Assurance Manager of the H2020 BADGER project, as well as the Scientific and Technical Manager of the H2020 Ageing@Work project.



**Dr. Ilias Kalamaras** is a post-doctoral research associate in CERTH/ITI. He received his diploma in electrical and computer engineering from the Aristotle University of Thessaloniki in 2010. He also holds a PhD in multimodal dimensionality reduction from the Intelligent Systems and Networks Group of Imperial College London since 2016. His main research interests include artificial intelligence, graph-based dimensionality reduction, clustering and visualization of multimodal data, multimodal behavior-based mobile network activity analysis for network security, multimodal content-based clustering and retrieval and accessibility-based multimedia ranking. He has been the co-author of related publications in conferences and journals. During his cooperation with CERTH/ITI, he has participated in several European projects related to data analytics and artificial intelligence.



**Dr. Ioannis Mariolis (male)** is a Post-doctoral Research Fellow in CERTH/ITI. He received the Diploma degree and the Ph.D. degree in Electrical and Computer Engineering, in 2002 and 2009, respectively, both from the University of Patras (UoP)- Greece. During 2010 and 2011, Dr. Mariolis worked as a post-doctoral research assistant at the Medical Physics Laboratory - School of Medicine-(UoP). He has been a teaching assistant at TEI Patras (2009-2011). His main research interests include machine learning, robotic vision, medical image analysis, and statistical signal processing. He has been **the (co)author of more than 32 scientific papers** in refereed journals, edited books, and international conferences. Dr. Mariolis has also been involved in more than six research projects funded by the EC and the Greek secretariat of Research and Technology. He is also a member of the Technical Chamber of Greece.



**Dr. Papadopoulos Stavros (M)** received the Diploma and PhD degree in Electrical and Computer Engineering, in 2010 from the Aristotle University of Thessaloniki (AUTH) and in 2016 from Imperial College London (ICL), respectively. His doctoral thesis focused on the research of novel visual and data analytics methods for the analysis of graph structures and the detection of anomalies in wired and mobile networks. Since 2011, Dr. Papadopoulos has been working as a research fellow and from 2016 as a postdoctoral research associate in Information Technologies Institute (ITI). His main research interests include artificial intelligence, deep learning, network security, visual/data analytics, and data mining. During the last five years he has (co)authored 24 scientific papers. He has also been involved in multiple projects funded by the EC, concerning data analytics, anomaly detection, and deep learning techniques.



**Mr. Athanasios Salamanis** is a software engineer and computer scientist. He received his master's degree in electrical and computer engineering from the Aristotle University of Thessaloniki, Greece, in 2013. In September 2013, he started working as a software engineer at the Information Technologies Institute of the Centre for Research and Technology Hellas (CERTH/ITI) in Thessaloniki, Greece. In July 2018, he was promoted to the position of senior lead software engineer at CERTH/ITI, where he works to this day. Since October 2016, Mr. Salamanis is a PhD candidate at the Electrical and Computer Engineering Faculty of the Democritus University of Thrace, Greece. His main research interests include high performance computing, big data analytics and time series forecasting. He has published scientific papers and technical reports in several prestigious peer-reviewed journals and conferences. His work has received 140 citations according to Google Scholar (as of October 2020). He also serves as a reviewer in highly prestigious scientific journals and conferences. Mr. Salamanis is an advocate of software development techniques, programming paradigms, design patterns and methodologies focusing on the design, development, testing, deployment and maintenance of clean, structured, reusable, efficient, scalable and documented software.



**Georgios Spanos** received from Aristotle University of Thessaloniki, his Bachelor in Informatics in 2008, his Master in Informatics and Management in 2011 and his PhD in Informatics in 2019.

His research interests are focused on Statistical and Machine Learning Methods, on Information Security and on Stock Market.

He has worked for 4 years as Software Engineer in the private sector and from February of 2019 he works as Postdoctoral Research Fellow at the Information Technologies Institute (ITI) of the Center for Research and Technology-Hellas (CERTH).



**Ms. Tsourma Maria** is a research associate in CERTH /ITI since 2016. She has received her diploma in “Informatics and Telecommunications Engineering” (2016), from the University of Western Macedonia. Her main research interests among others include User Experience design, Human-Computer Interaction, data mining, Artificial Intelligence (AI) and Natural Language Processing (NLP). During her collaboration with CERTH/ITI, she has participated in several European projects related to work schedule management and task assignment, Natural Language Processing (NLP) methods, Robotic process automation algorithms, Decision support systems and has also been the co-author of related publications.

