

COMPUTER AND EMERGING NETWORKS

Two virtual international block courses for bachelor students in computer science and engineering.

DATA SCIENCE FOR ENGINEERS

JUNE 28th – JULY 2nd, 2021



COMPUTER AND EMERGING NETWORKS

The workshop provides an overview of the architecture, algorithms, and protocols used for developing scalable networks. Students will learn advanced network topics on the technical foundations through which future generation networks can be designed.

Subsequently students will dive into the details of Emerging Networks using softwares like GNS3 and Cisco Packet Tracer.

Target Group: Bachelor Computer Science

Prerequisites: Good command in Computer Network basics, OSI model and internet protocols

Lecturers: Stephan Recker, Dortmund University of Applied Sciences and Arts
Anjum Malik, Dortmund University of Applied Sciences and Arts

For further information: indutwin@fh-dortmund.de

Day	German time	28/06/2021	Lecturer
28/06	15:00-15:30	Kick off and some organizational questions	Recker
	15:30 - 17:00	Lecture on Packet Switching and Internetworking - 1 (Switching and Forwarding Bridges, LAN Switches, Packet Switching and Introduction to Internetworking)	Malik
	17:30 - 19:30	Lab on Spanning Tree Protocol	Malik / Recker
	19:30 - 21:30	Lecture on Packet Switching and Internetworking - 2 (Routing Algorithms - Distance Vector routing Link state routing and Inter AS routing)	Malik
29/06	15:00 - 17:00	Exercise on Distance Vector and Link State Routing	Malik
	17:30 - 19:00	Lecture on Switching and Routing: OSPF and CSPF	Recker
	19:00 - 21:30	Lab OSPF	Recker
30/06	15:00-17:00	Lecture on Switching and Routing: BGP and MPLS	Malik
	17:30 - 20:00	Lab: BGP and MPLS	Malik
	20:15 - 21:45	Lecture on VXLAN	Malik
01/07	15:00-16:30	Lecture on EVPN	Malik
	16:30 - 18:30	Lab on VXLAN and EVPN	Malik
	19:00 - 21:30	Feature Topic (Router Redundancy Protocol, Equal Cost Multicast Routing)	Malik / Recker
02/07	15:00-16:30	Lecture on Emerging Networks: Cloud Architecture and Network Virtualization	Malik
	16:30 - 18:00	Lecture on Emerging Networks: Software Defined Networking (SDN)	Malik
	18:30 - 20:00	Lecture on Emerging Networks: Cognitive Radio Networks and Network Science	Malik
	20:00 - 21:00	Lab SDN - Possibly (TBD)	Malik / Recker
	21:00 - 21:30	Closing of Summer School	Recker

DATA SCIENCE FOR ENGINEERS

In all engineering disciplines, it can be observed that data processing accounts for an increasingly large part of the work. In this context, decisions made by engineers are usually determined on the basis of collected data. However, the amount of data engineers have access to is often limited, especially when it comes to very large amounts of data (Big Data).

In this case, data science skills become a valuable addition to the range of competencies of engineers in order to be able to meaningfully examine even very large amounts of data for their meaningfulness and to make better decisions. The Internet of Things (IoT) and the associated digitalization will further accelerate this development in the future.

In this course, students will learn how to successfully use the Python programming language to analyze large amounts of data and thus create the essential foundations for the creation of machine learning models.

Target Group: Bachelor Mechanical Engineering

Prerequisites: No prior programming knowledge is required

Lecturer: Kay Suwelack, Dortmund University of Applied Sciences and Arts

For further information: indutwin@fh-dortmund.de

German Time	Monday	Tuesday	Wednesday	Thursday	Friday
14:00-15:00	Lecture: Introduction to Data Science	Lecture: <i>Data manipulation with pandas 1</i>	Lecture: Visualizing data with Matplotlib 1	Lecture: <i>Importing data with Python</i>	Lecture: <i>Intro to your first data science project</i>
15:00-16:00	Lecture: <i>Introduction to Python 1</i>	Break-Out: <i>Coding Exercise</i>	Break-Out: <i>Coding Exercise</i>	Break-Out: <i>Coding Exercise</i>	Break-Out: <i>Coding your first data science project</i>
16:00-17:00	Break-Out: <i>Coding Exercise</i>	Lecture: <i>Data manipulation with pandas 2</i>	Lecture: <i>Visualizing data with Seaborn</i>	Lecture: <i>Time Series in Python</i>	
17:00-18:00	Lecture: <i>Introduction to Python 2</i>	Break-Out: <i>Coding Exercise</i>	Break-Out: <i>Coding Exercise</i>	Break-Out: <i>Coding Exercise</i>	
18:00-19:00	Break-Out: <i>Coding Exercise</i>	Lecture: Joining data with pandas	Lecture: <i>Visualizing data with bokeh</i>	Lecture: Explorative data analysis	Student presentation: <i>Project results</i>
2-3 hours self organized	Exercises	Exercises	Exercises	Exercises	