DATA PLANE PROGRAMMING
VT2021

HHK3.KAU.SE/DPP

COMPUTER SCIENCE
DATAVETENSKAP

AGENDA FOR WEBINAR

- Welcome to the Course and Computer Science Department
- Introductions and Expectations
- About the Course
- Next Steps

Please note: The webinar will be recorded. We intend to make available the video for course participants. When enabling your camera and microphone, you agree that your video and audio will be recorded and made available electronically. In case you do not want your video/audio to be recorded, switch off your video and mic. You can interact with us via Slack, too.

COMPUTER SCIENCE DEPARTMENT

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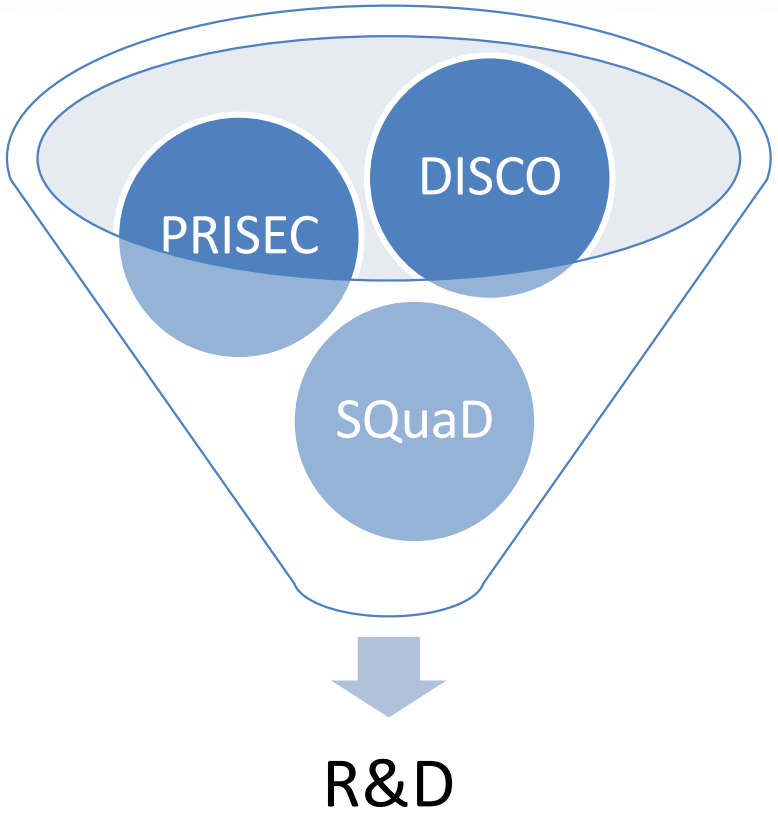
CS – FACTS AND FIGURES

- Established in 1986
- Excellent Group at Karlstad University
- Involved in Research, undergraduate and graduate education in cooperation with companies and other organizations
- Over 50 researchers and Ph.D. Students in Computer Science
- International Visitors and Guest Researchers

CS – RESEARCH

- Our research in Computer Science is mainly focused on Computer Networking, IT security and privacy enhancing technologies, and Software Quality.
- Our research environment is multinational with internationally renowned researchers.
- Through interdisciplinary research within the focus areas and joint projects with external partners, from both academia and industry, we contribute to the technology and society of tomorrow.

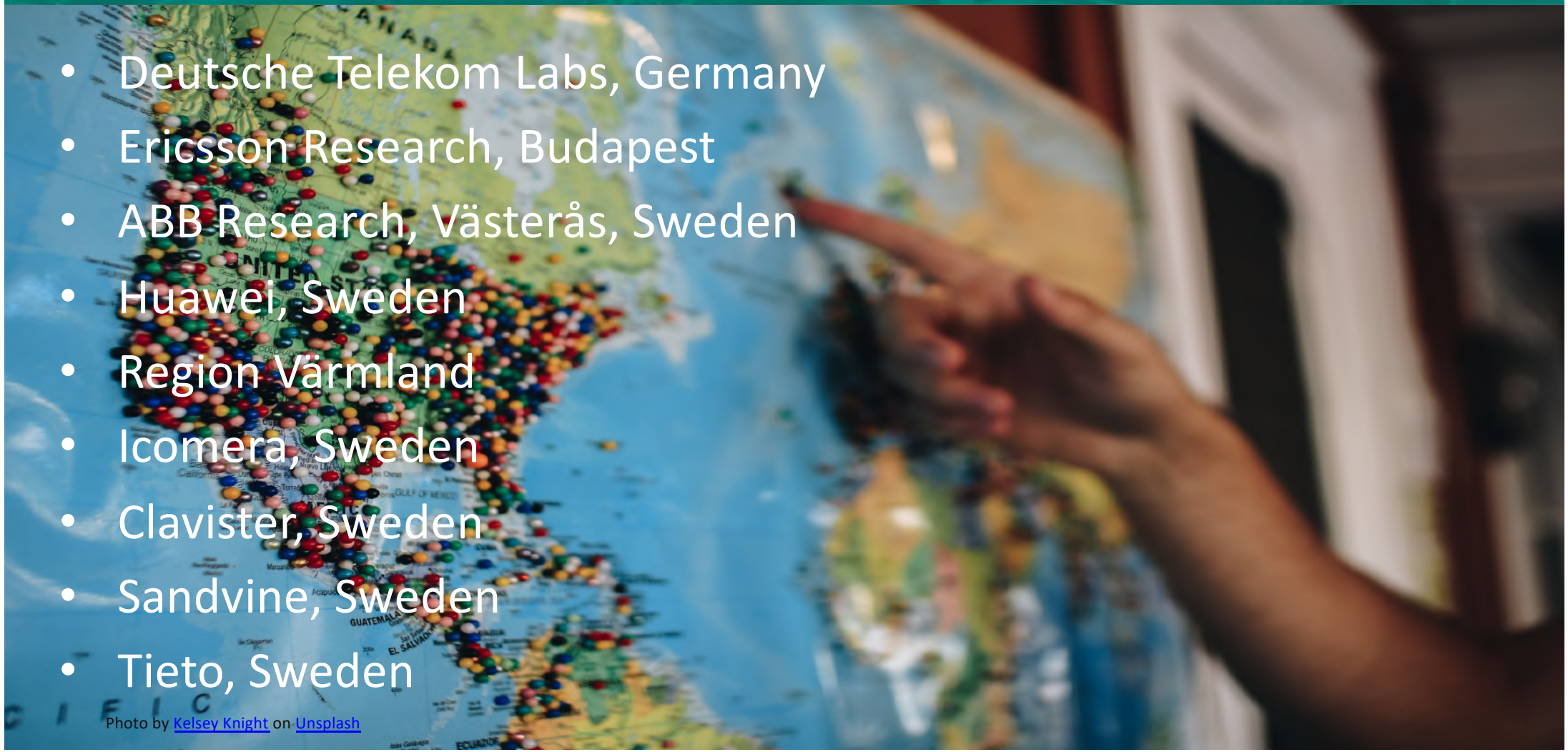


ACADEMIC COOPERATION - EXAMPLES

- University of California Los Angeles (UCLA), US
- Queen Mary Univerity, UK
- Brown University, US
- UPC, Spain
- FER, University of Zagreb, Croatia
- Tokyo Tech, Tokyo, Japan
- Universita' di Roma Tor Vergata, IT
- University of Napoli Federico II, IT
- University of Sydney, Australia

Photo by Kelsey Knight on Unsplash

INDUSTRIAL PARTNERS - EXAMPLES



- Deutsche Telekom Labs, Germany
- Ericsson Research, Budapest
- ABB Research, Västerås, Sweden
- Huawei, Sweden
- Region Värmland
- Icomera, Sweden
- Clavister, Sweden
- Sandvine, Sweden
- Tieto, Sweden

Photo by Kelsey Knight on Unsplash

MORE INFORMATION

- https://www.kau.se/en/cs/

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MENTIMETER

- **What are your course expectations, what is your background, etc.**
  - Go to **menti.com** and use the code **45 46 167**
  - Mentimeter

PURPOSE OF THE COURSE

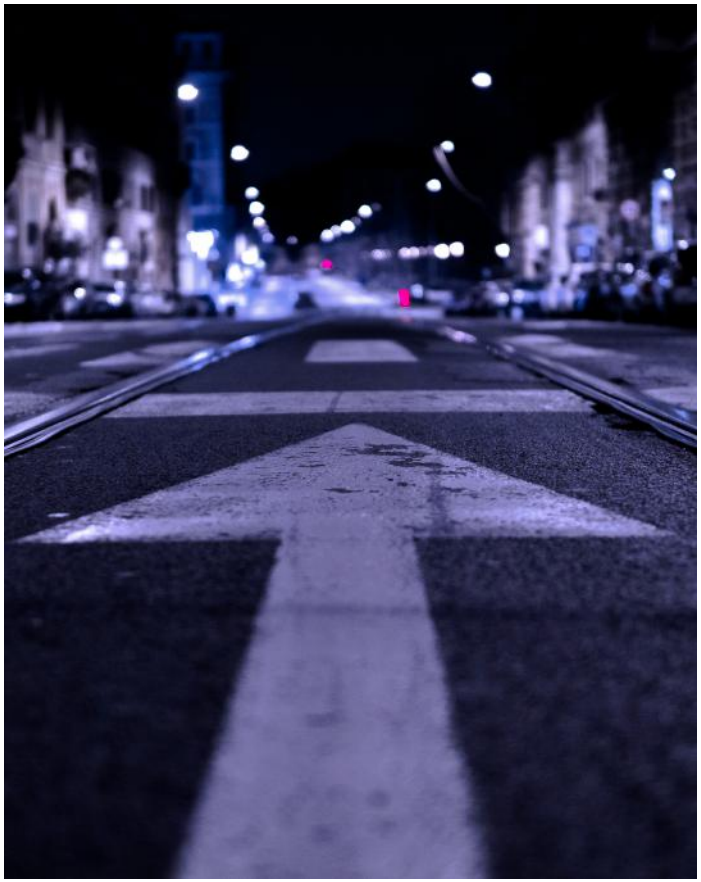

Photo by Vek Labs on Unsplash

- To prepare participants for theoretical and practical work related to Data Plane Programming by introducing you to useful methods and theories

- Connect business professionals through engaging conversations around current research on the topic of Data Plane Programming

TWO COURSES IN ONE

Do you want to learn more about Data Plane Programming?

Credit Bearing Distance Course

Open networked Learning course

Course Homepage: [hhk3.kau.se/dpp](hhk3.kau.se/dpp)

Photo by Pablo García Saldaña on Unsplash

ORGANIZERS

- Andreas Kassler
  Professor in Computer Science
  mail: andreas.kassler@kau.se
  phone: +46 706 84 19 01
  twitter:

LEARNING OUTCOMES – DVAD40

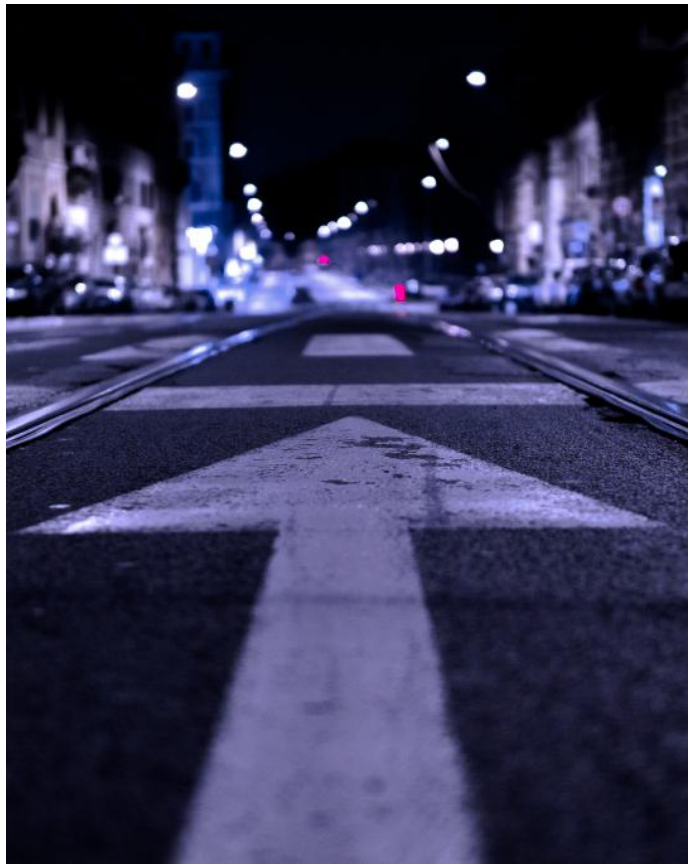

Photo by Vek Labs on Unsplash

- Upon completion of the course, students should be able to:
  - give an account of basic principles and concept of dataplane programmability and differences from software defined networking,
  - give an account of alternative approaches regarding load balancing and routing for data center networks,
  - give an account of basic principles and concepts of network monitoring, In-band Network Telemetry (INT), In-network caching, and control

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TEACHING PLATFORMS

hhk3.kau.se/dpp

- The course homepage
  - All information regarding the course will be available and continuously anounced on the course homepage
- Webinars will be held on the platform Zoom
  - To participate, simply click the provided link for each meeting and enter as guest, stating your name
  - Check that your webcam and mic works → Will be recorded and made available
- Graded assignements will be available on Canvas
  - For officially registered students, at the end of each module

TEACHING MATERIALS/TOOLS

- Video Webinars
  – Serve also as discussion
- Readings will be assigned
  – Augmented by videos and web material
- Practical exercises with mininet available through git
- Video interviews or other material from our industrial collaborators

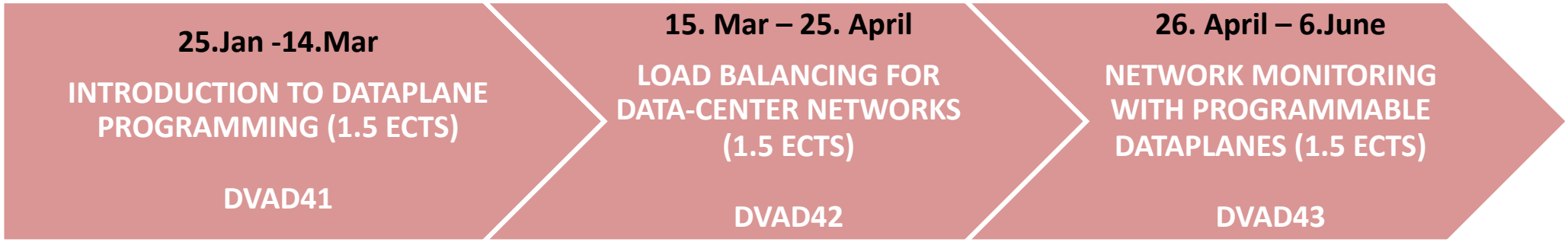
SLACK CHANNELS

- To foster discussion among course participants
  - Share experience
  - Learning from each other
  - …
- We have created the following channels:
  - #general: This channel is used for course-wide communication and announcements. All members are in this channel.
  - #course-admin: This channel is reserved for Course Administrative Message Announcements.
  - #introduction-to-dpp: This channel is used for discussion posts in relation to all modules

SLACK CHANNELS

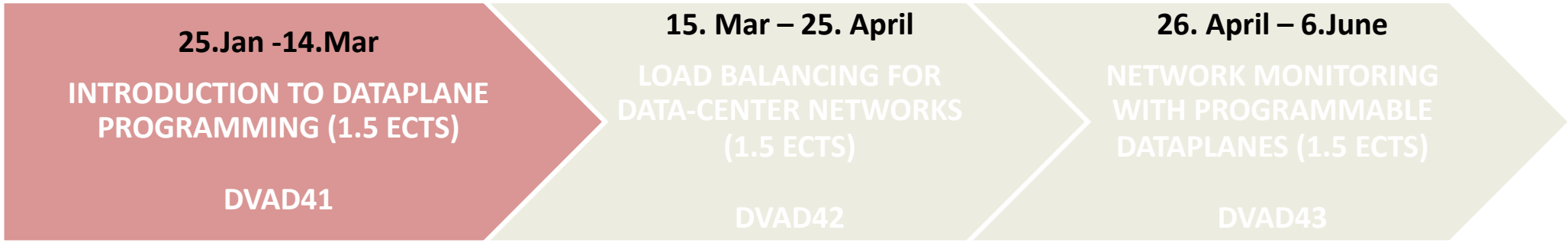
- **Introduce yourself now**
- Join Slack: https://bit.ly/2RsWKze
- **Go To Slack** #introduction-to-dpp
  - Write some sentences about you
    - For which organization do you work?
    - Which university you are now?
    - What is your role there?
    - Etc..

COURSE LAYOUT



COURSE LAYOUT

- Introduction to Data Plane Programming
  - DVAD41: Module 1



MODULE 1 – INTRODUCTION TO DATA PLANE PROGRAMMING

- Learning Goals:
  - Give an account of basic principles and **concept of Dataplane programmability** and differences from Software Defined Networking,
  - identify **key challenges** and differences between Software Defined Networking and **Dataplane Programmability**, and
  - demonstrate broad knowledge of **limitations and capabilities** of the most common data plane programming language **P4**,
  - **implement and test small-scale P4 programs** (e.g. Switch).

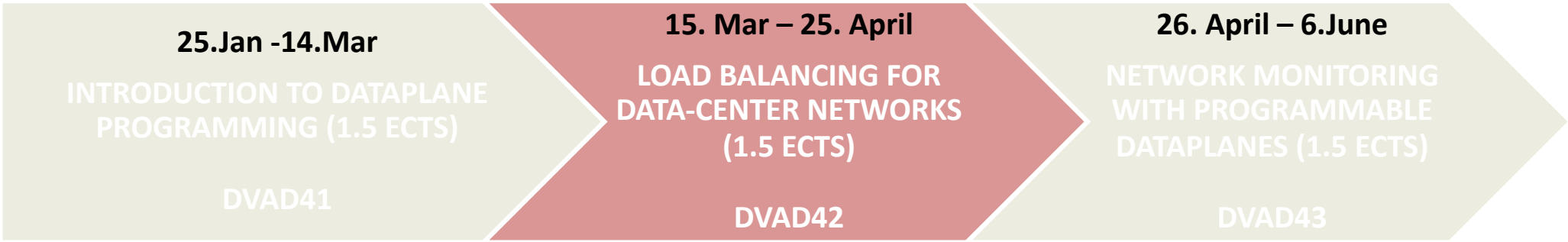
https://www.kau.se/en/education/programmes-and-courses/courses/DVAD41

ASSIGNMENTS IN MODULE 1

- Everyone:
  - Active Participation (Webinar and Slack)
  - P4 Tutorials, basic exercises, read papers, watch videos
  - Quizz questions
  - Discussion posts
- For the Credit bearing course the following is required:
  - Submit assignment (graded)
  - Quizz and discussion posts

COURSE LAYOUT

- Loadbalancing for datacenter networks
  - DVAD42: Module 2



MODULE 2 – LOADBALANCING FOR DATACENTER NETWORKS

- Learning Goals:
  - give an account of basic principles and concepts of **Data Center networks**,
  - give an account of alternative approaches regarding **load balancing** and routing for **Data Center networks**,
  - explain domain-specific concepts related to **data plane programming** regarding **load balancing** for Data Center networks,
  - implement **simple data-plane load balancing in P4**.

Prerequisite: DVAD41!

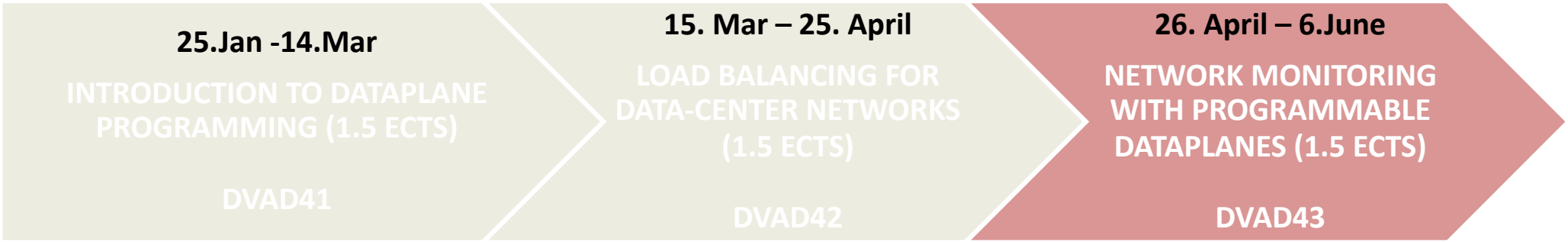
https://www.kau.se/en/education/programmes-and-courses/courses/DVAD42

ASSIGNMENTS IN MODULE 2

- Everyone:
  - Active Participation (Webinar and Slack)
  - P4 Tutorials, basic exercises, read papers, watch videos
  - Quizz questions
  - Discussion posts
- For the Credit bearing course the following is required:
  - Submit assignment (graded)
  - Quizz and discussion posts

COURSE LAYOUT

- Network Monitoring for Programmable data planes
  - DVAD43: Module 3



MODULE 3 – NETWORK MONITORING FOR PROGRAMMABLE DATA PLANES

- Learning Goals:
  - give an account of basic principles and concepts of **network monitoring, In-band Network Telemetry (INT), In-network caching, and control**,
  - describe techniques for **network monitoring, INT, In-network caching, and control**
  - explain how the **INT framework** can be programmed.

Prerequisite: DVAD41

https://www.kau.se/en/education/programmes-and-courses/courses/DVAD43

ASSIGNMENTS IN MODULE 3

- Everyone:
  - Active Participation (Webinar and Slack)
  - P4 Tutorials, basic exercises, read papers, watch videos
  - Quizz questions
  - Discussion posts
- For the Credit bearing course the following is required :
  - Submit assignment (graded)
  - Quizz and discussion posts

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NEXT ONLINE MEETINGS FOR MODULE 1

- Online Schedule
  - Webinar 1: Course Introduction and Intro to Dataplane
    - Now☺
  - Webinar 2: Introduction to P4
    - Monday, 8th Feb, 17:00 – 19:00 Stockholm Time
    - https://kau-se.zoom.us/j/66276262445
  - Webinar 3: Basic P4 Exercises
    - Monday, 22th Feb, 17:00 – 19:00 Stockholm Time
    - https://kau-se.zoom.us/j/66276262445
  - Webinar 4: Advanced P4 Exercises
    - Monday, 8th March, 17:00 – 19:00 Stockholm Time
    - https://kau-se.zoom.us/j/66276262445

NEXT STEPS

- Go to the course webpage https://hhk3.kau.se/dpp/
  - Make yourself familiar with the course homepage
  - Read syllabus
  - Start to read the papers, watch videos, etc.
  - Each module comes with a weekly plan for you.
  - Until the next webinar, see online schedule for week 1 and week 2
- Join Slack Channel
  - Join link: https://bit.ly/2RsWKze
  - Several channels, see Webpage
  - Can also download Slack app to get notifications

AGENDA FOR WEBINAR

- Questions? → **In Slack** #introduction-to-dpp
- Wrapup
  - Go to **menti.com** and use the code **45 46 16 7**
  - Mentimeter