

Module title Advanced Computer Networks				
Module code YACN	Level Bachelor (B.Sc.)	Hours per week 4	ECTS credits 5	Duration 2 weeks block course + virtual lectures
Module instructor Dr. Milena Radenkovic, School of Computer Science, University of Nottingham, UK	Lecture type Regular lecture, on line consultations, in- class exercises	Prerequisite(s) Good level of Java programming (the main simulator used in the course is written in Java) <small>For those who prefer C/C++, they can choose another simulator but the labs support will be focused on Java based simulator</small>		Grading Coursework
Objectives				
<ul style="list-style-type: none"> To deepen students' understanding of the use and operation of fixed and mobile communications networks, in particular both benchmark and state of the art Internet protocols and their use in modern telecommunications and emerging mobile networks; To deepen students' understanding of a wide range of routing protocols and services in Mobile Ad Hoc Networks (MANETs), Vehicular Ad Hoc Networks (VANETs), Delay/Disconnection/Tolerant Networks (DTNs), Opportunistic Networks and Mobile Social Networks. To improve students' understanding of distributed peer to peer systems and algorithms for data dissemination and query in mobile intermittent environments and provide examples of Information Centric Networks (ICNs) and Content Centric Networks (CCNs). To improve students' understanding of Software Defined Networks and illustrate how they can be used for complex large-scale networks control. To appreciate the real-world social and ethical impacts upon user experience in the design and application of various networks and services. To develop an understanding of the practical skills required in the design and development of network protocols and services in different application scenarios. 				
Content				
<ul style="list-style-type: none"> This module will provide students with an advanced knowledge of computer communications networks, using examples from all-IP core telecommunications networks to illustrate aspects of transmission coding, media access, internet protocols, routing and security. The module will describe Software Defined Networks (SDNs) and provide examples of using them to enable very large scale complex network control. The module will provide an advanced knowledge of various routing and query protocols in: Ad Hoc Networks, Mobile Ad Hoc Networks (MANETs), Vehicular Ad Hoc Networks (VANETs), Disconnection/Disruption/Delay Tolerant Networks (DTNs), Mobile Social Networks, Opportunistic Networks, Information Centric Networks, Content Centric Networks. The social impact of new networking developments, such as security risks, ethics, interception and data protection, will be reflected and discussed systematically. Students will spend around three hours per week in lectures and one hour per week in computing classes This module will include Coursework in which the students will need to design an application scenario in a simulator (ONE or NS3), identify and select appropriate networks and communication protocols to use in this scenario, make relatively simple modifications to the existing protocols to address particular assigned task and perform protocol evaluation against other protocols across a range of criteria (delivery ratio, delay, packet loss); for the best marks (high first class marks), students will need to make more complex changes to the protocols 				
Textbook/teaching material				
<ul style="list-style-type: none"> Delay and Disruption Tolerant Networking, Stephen Farrell, Vinny Cahril; Delay Tolerant Networks : Protocols and Applications, Athanasios V. Vasilakos, Yan Zhang, Thrasyvoulos Spyropoulos Mobile Ad Hoc Networking, Stefano Basagni, Marco Conti, Silvia Giordano, Ivano Stojmenovic Mobile Ad Hoc Networking: The Cutting Edge Directions 2nd Edition, Stefano Basagni, Marco Conti, Silvia Giordano, Ivan Stojmenovic 				

- Information Centric Networks: A New Paradigm for the Internet, Gabriel M. de Brito, Pedro B., Velloso, Igor M. Moraes
- Routing in Opportunistic Networks, Isaac Woungang, Sanjay Kumar Dhurandher, Alagan Anpolagan, Athanasios V. Vasilakos
- Computer Networks and Internets, Douglas E. Comer, Prentice Hall
- Tannenbaum, Computer Networks, Prentice Hall
- Unix Network Programming, Richard Stevens
- TCP/IP Illustrated, Volume 1: The Protocols, Richard Stevens
- Halsall, Data and Computer Communications, Macmillan

Note: this is not the official course descriptor according to the "Studien- und Prüfungsordnung" (SPO)