

# UG3 Computer Communications & Networks (COMN)

2019-20, Semester 2

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# Overview

- Introductory/foundational course on Computer Communications & Networks
  - Focus on fundamental concepts, highly successful design principles and widely used protocols/techniques
  - Advanced topics: multimedia and software-defined networking
- 20 credit course
- No pre-requisite courses
- Assumes familiarity and programming (in Java) on Linux platforms
- A pre-requisite for UG4/MSc Computer Networking course (**not taught this year but likely next year**)
- Must be familiar with this course's material if planning on doing 4<sup>th</sup> year project on a networking topic

# Administrative Details

- Instructor: Prof Mahesh Marina ([maresh@ed.ac.uk](mailto:maresh@ed.ac.uk))
  - Informatics Forum 1.20
  - Office Hours: by appointment
- Teaching Assistant: Mohamed Kassem ([M.M.M.Kassem@sms.ed.ac.uk](mailto:M.M.M.Kassem@sms.ed.ac.uk))
  - Informatics Forum 1.17
  - Office Hours: by appointment
- Out-of-class communication
  - Course mailing list: [comn-students@inf.ed.ac.uk](mailto:comn-students@inf.ed.ac.uk)
  - Q&A via Piazza (link will be made available)

# Administrative Details

- When and Where: Semester 2
  - Tuesdays, 15:30-17:00 in H. R. B Lecture Theatre
  - Wednesdays, 15:30-17:00 in Lister G.01 (wks 1-5, 9-11) & 7 George Square F.21 (wks 6-9)
- Course descriptor
  - <http://www.drps.ed.ac.uk/19-20/dpt/cxinfr10074.htm>
- Course webpage
  - <http://www.inf.ed.ac.uk/teaching/courses/comn/>
  - Schedule w/ lecture slides, assignments, TA contact info, past exam papers, examinable material, etc.

# Activities & Assessment

- Two lectures per week
  - Tutorial or guest lectures in some of the lecture slots (TBA)
- No formal tutorials
- **Exam (60% of course mark)**
  - Past exam papers: [http://www.inf.ed.ac.uk/teaching/exam\\_papers/](http://www.inf.ed.ac.uk/teaching/exam_papers/)
  - List of examinable material will be provided on course webpage

# Activities & Assessment

- **Coursework (40% of course mark): one assignment, split in two parts**
  - Will involve programming using Java and socket API
  - Implementation and experimentation of application-level protocols for reliable end-to-end communication
  - Part 1: 30% of coursework mark / 12% of course mark
    - Due by 4pm on Fri, 14<sup>th</sup> February 2020
  - Part 2: 70% of coursework mark / 28% of course mark
    - Due by 4pm on Fri, 20<sup>th</sup> March 2020

# Syllabus

- **Introduction to Computer Networks, the Internet, TCP/IP architecture and protocols**
  - Protocol, network architecture, reference models, layering, service, interface, multiplexing, switching and standards
- **Application Layer**
  - Network applications (Web/HTTP, ...) and socket API
- **Transport Layer**
  - Connectionless vs. connection-oriented communications
  - Congestion/flow/error control

# Syllabus

- **Network Layer**
  - Routing and internetworking
- **Data Link Layer and Medium Access Control Sub-Layer**
  - Data link protocols, error detection and correction, channel allocation and multiple access protocols, Ethernet
- **Multimedia networking**
  - Audio/video streaming, content distribution networks, real-time protocol, session initiation protocol, quality of service
- **Software-defined networking (SDN)**
  - Introduction to SDN, OpenFlow, applications of SDN



# Textbooks

## **Main text:**

- J. F. Kurose and K. W. Ross, “Computer Networking: A Top-Down Approach” 7<sup>th</sup> edition, Pearson Education, 2017.

## **Secondary texts:**

- L. L. Peterson and B. S. Davie, “Computer Networks: A Systems Approach,” 5<sup>th</sup> edition, Morgan Kaufmann, 2012.
- A. S. Tanenbaum and D. J. Wetherall, “Computer Networks,” 5<sup>th</sup> edition, Pearson Education, 2011.

## **Courtesy note on course slides:**

- Slides borrowed/modified from others
  - Jim Kurose and Keith Ross