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# EENGM4221: Broadband Wireless Communications

## Introduction

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# Mission Statement / Learning Outcomes

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- This course provides understanding of:
  - The challenges of Broadband Wireless Communications
  - The technology solutions for meeting those challenges
- Illustrated by case study of several modern wireless standards
  - What techniques are used and why, for:
    - 802.11 (WiFi) Wireless Local Area Networks (WLAN)
    - 802.15 (Bluetooth) Wireless Personal Area Networks (WLAN)
    - 802.16 (WiMax) Wireless Metropolitan Area Networks (WMAN)

# Format of Course and Assessment

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- Course Consists of:
  - ~24 Lectures
  - Use of in class questions for formative assessment via [pollev.com/simonarmour](https://pollev.com/simonarmour)
- Assessment takes the form of:
  - Terminal Exam (100%)

# Other Units

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- This course considers Mobile Communications Systems (EENG30010) and Networks and Protocols (either EENG30002 or EENGM0007) to be prerequisites.
- Advanced Mobile Radio Techniques (EENGM2510) and Coding Theory (EENGM2011) are also relevant and complimentary but not requisite.
- Knowledge of some elements of the prerequisite courses will therefore be assumed.
- Where appropriate, links to relevant aspects of the other courses will be highlighted but these are NOT essential to this unit.

# Reading Material (1)

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- Many interesting and relevant textbooks exist which cover some or all of the material covered in this course. The following are suggested reading:
  - A.Ganz, Z.Ganz, K.Wongthavarawat, ‘Multimedia Wireless Networks: Technologies, Standards and QoS’, Prentice Hall, ISBN 0-13-046099-0
    - Referred to as GANZ
    - QoS, WiFi, WiMax, Bluetooth
  - M.Gast, ‘802.11 Wireless Networks: The Definitive Guide,’ O’Reilly, ISBN:0-596-00183-5
    - Referred to as GAST
    - WiFi

# Reading Material (2)

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- W.Stallings, ‘Wireless Communications and Networks,’  
Prentice Hall, ISBN: 0-13-040864-6
  - Referred to as STAL
  - Fundamentals, Challenges, WiFi, Bluetooth
- A.S. Tanenbaum, ‘Computer Networks (4th Edition),’ Prentice  
Hall, ISBN: 0-13-0384887
  - Referred to as TAN
  - Fundamentals, WiFi, Bluetooth, WiMax
- Links to the appropriate textbooks and taught units are  
provided in shorthand in the bottom left corner of the  
lecture slides.

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Ref:

This is where the links to reading material will  
appear!

18/01/2021

# Syllabus (in brief)

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- We will start by establishing a framework for our study by considering:
  - Definitions of WLAN/WPAN/WMAN/WWAN
  - Layered Protocol Models
  - Multiple Access and Duplexing Methods
  - Network Architecture
  - Control Methodologies

# Syllabus (in brief)

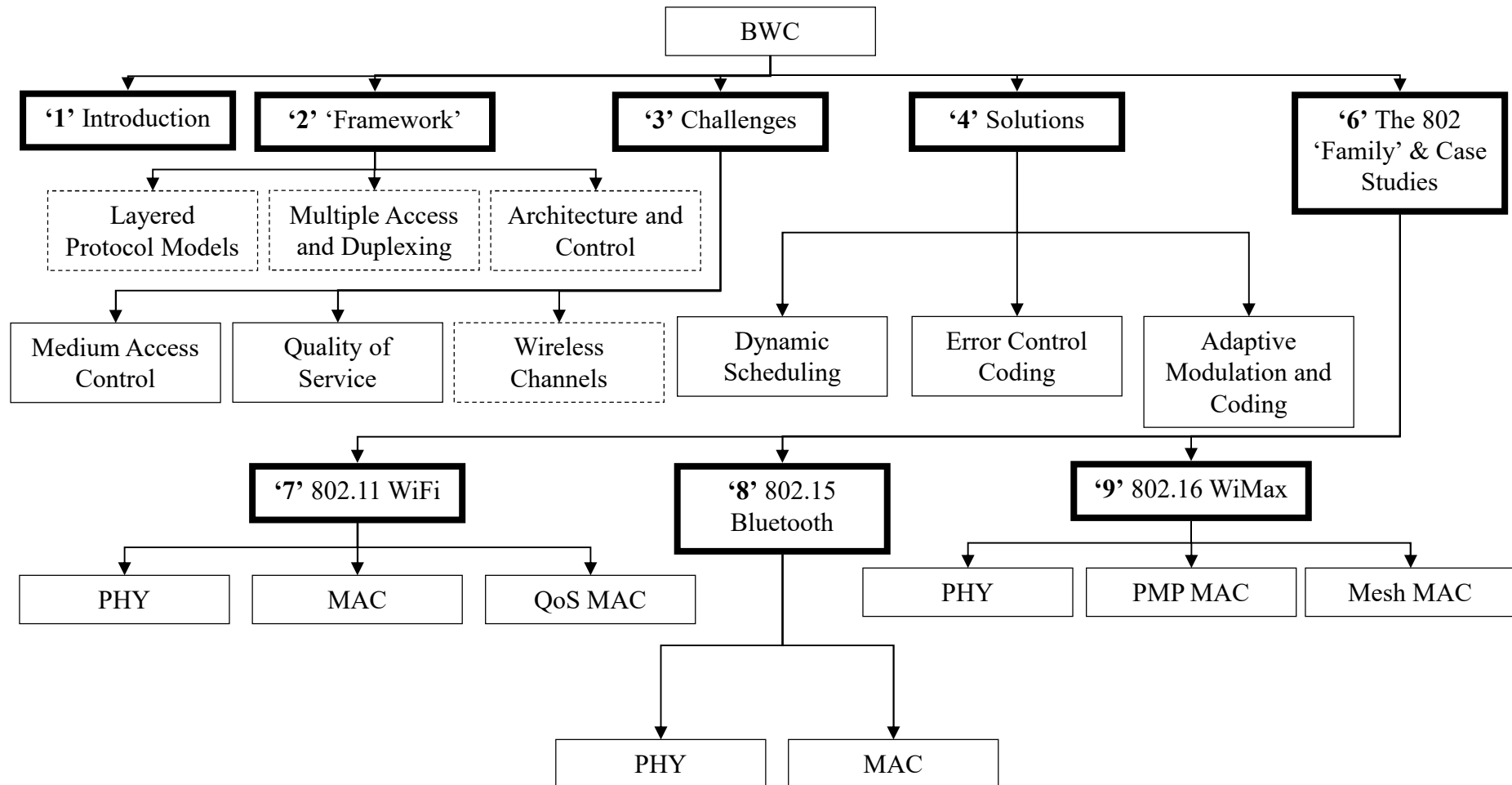
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- Subsequently we will consider the inherent challenges of Broadband Wireless Communications...
  - The Wireless Channel
  - Medium Access Control/Multiple Access
  - Quality of Service
- ...and some clever solutions to these challenges
- Some of this will be revision
- We will conclude with case studies of the relevant standards to illustrate real world solutions currently or soon to be deployed



# Course Roadmap



Ref:

18/01/2021