EEE4121F
Mobile and Wireless Networks

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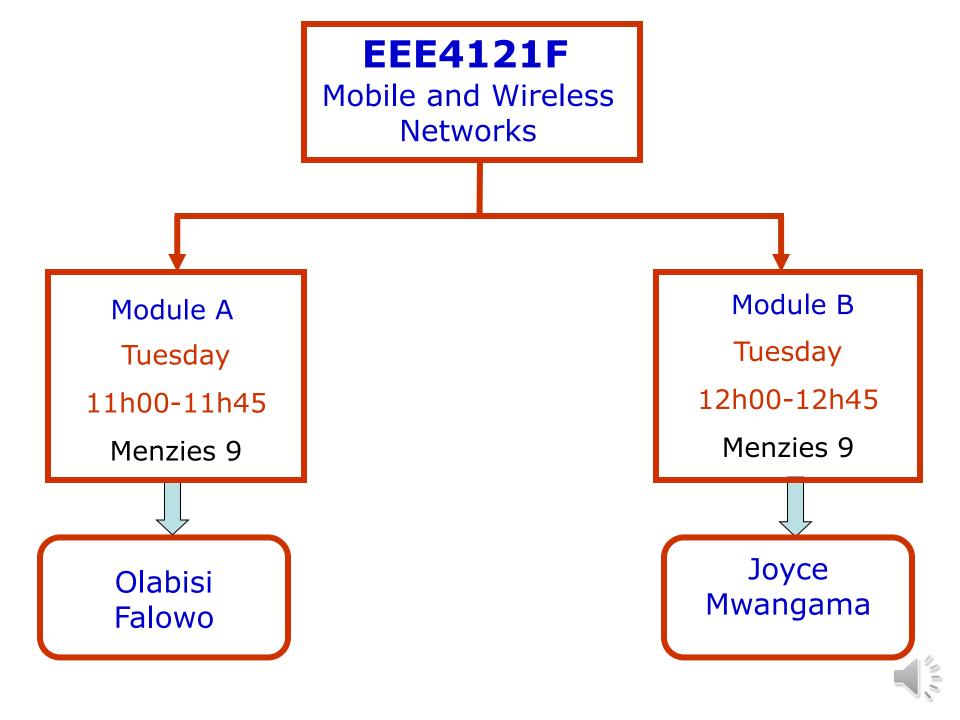
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What are your goals for this semester?

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EEE4121F
Mobile and Wireless Networks

- ◆ 16 Credits
- ◆ 48 Lectures
- ◆ 4 Labs
- ◆ 2 Projects
- ◆ 5 Tutorials

Prerequisite
- ◆ EEE3093S or equivalent

- ◆ 4th year telecom courses are needed for senior telecom projects, MSc dissertation, and PhD thesis.

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Instructors and TA

Instructors

- Olabisi FALOWO, olabisi.falowo@uct.ac.za
  Menzies 4.42
- Joyce Mwangama, jb.mwangama@uct.ac.za
  Menzies 4.13

Teaching Assistant:

- Maurine Chepkoech, chpmau001@myuct.ac.za

Course Materials/Assessment Tasks

❑ Course materials will be available on VULA

❑ Tutorial questions, lab assignments, and projects will be released on VULA

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Face-to-Face Lecture Hours

❑ EEE4121F Module A:
Tuesday, 11h00 – 11h45
Venue: Menzies 9

❑ EEE4121F Module B:
Tuesday, 12h00 – 12h45
Venue: Menzies 9

Note:
You are required to attend the face-to-face lectures for this course.

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Assessment

(1) Module A: 50%

(2) Module B: 50%

Tests and Exam Dates

(1) Test 1: 22 March

(2) Test 2: 10 May

(3) Exam: May/June

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Assessment of the Course

♦ DP requirements:

    (1) 100% Tutorial submission

    (2) 100% Lab submission

    (3) 50% Lab mark average (minimum)

    (4) Pass the ECSA GA evaluation in the two projects

♦ Assessment strategy

Assessment Task	%
Tutorials	5
Labs	10
Projects	10
Tests	15
Exam	60
Total	100

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Plagiarism

Please note that plagiarism is a very serious offence and usually leads to disciplinary action that could include expulsion from the university.

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EEE4121F Module A

(a) Aim of the Module

To provide students with the knowledge of mobile and wireless access network technologies and radio resource management techniques to support voice and data communications.

(b) Expected Module Outcome

On successful completion of this module, students will be able to:

1. Understand the architecture and protocols of current and emerging access networks.

2. Identify the differences and similarities among different access technologies

3. Understand the importance resource management in wireless networks

4. Analyze the performance of radio resource management algorithms

5. Acquire general background needed for research project in wireless networks

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EEE4121F Module A

(a) Wireless Access Technologies:

♦ History of wireless communication, and future trends

♦ Cellular concept and cellular system fundamentals

♦ WLAN

♦ 2G and 2.5G Wireless Network

♦ 3G Wireless: UMTS and CDMA2000

♦ 4G and 5G wireless networks

♦ Heterogeneous wireless networks

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EEE4121F Module A

(b) Radio Resource Management

♦ Radio resource management algorithms

♦ Performance evaluation of radio resource management algorithms

(c) Mobility Management

♦ Types of mobility

♦ Location management

♦ Handover management

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EEE4121F MODULE-A

Week	Lecture Content
Week 1 (14 Feb)	eee4121F-001-Telecommunication Trends
	eee4121F-002-History and Concepts
Week 2 (21 Feb)	eee4121F-003-Spectrum
	eee4121F-004-Access-1
Week 3 (28 Feb)	eee4121F-005-Access-2
	eee4121F-006-WLAN
Week 4 (7 Mar)	eee4121F-007-2G Architecture
	eee4121F-008-3G Network
Week 5 (14 Mar)	eee4121F-009-LTE
	eee4121F-0010-Resource Management
Week 6 (21 Mar)	eee4121F-0011-Handoff
	eee4121F-0012-Admission Control
Vacation (28 Mar)	
Week 7 (4 Apr)	eee4121F-0013-Load Balancing
Week 8 (11 Apr)	eee4121F-0014-Network Model
Week 9 (18 Apr)	eee4121F-0015-5G
Week 10 (25 Apr)	eee4121F-0016-5G/6G
Week 11 (2 May)	eee4121F-0016-Mobility Management
Week 12 (9 May)	eee4121F-0014-Wireline Access

EEE4121F Module B

(a) Aim of the Module

This course aims at exposing the fundamental techniques, algorithms, and protocols underlying the recent technological advances in the fields of Broadband Networking.

Here is a preview of some of the content in Module B:

❑ Congestion in Networks

❑ Routing and Network Management

❑ Software-Defined Networking

❑ Programmable Networks

❑ Data Centre Network / Virtual Networks

❑ IoT Networks

❑ Content Distribution Networks

❑ etc…

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EEE4121F Module B

(b) Expected Module Outcome

A student who successfully completes this module will be able to:

♦ Explain how the differences between high-speed network protocols and traditional protocols aim at meeting the demands of high-speed applications.

♦ Use computer simulation to investigate network traffic performance

♦ Explain network protocols for QoS routing.

♦ Describe the changes needed for real-time applications and quality of service demands

♦ Understand congestion and traffic management

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ECSA Requirements

♦ Graduate Attributes 2 (GA 2) will be assessed in EEE4121F.

♦ Students will be assessed individually.

♦ Exit level outcomes assessment form will be completed for each student.

♦ Assessment will be based on 2 projects.

♦ Unsatisfactory performance in any of the specified aspects GA 2 will lead to overall unsatisfactory performance.

♦ Students with unsatisfactory performance after GA assessment will definitely get DPR (*Duly Performed Refused).*

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Graduate Attributes #2: Application of scientific and engineering knowledge	**Level Descriptor: Knowledge of mathematics, natural sciences, and engineering sciences is characterized by:**
Apply knowledge of mathematics, natural sciences, engineering fundamentals and an engineering speciality to solve complex engineering problems.	A systematic, theory-based understanding of natural sciences applicable to the discipline;
	Conceptual-based mathematics, numerical analysis, statistics and formal aspects of computer and information science to support analysis and modelling applicable to the discipline;
	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline; engineering specialist knowledge that provides theoretical frameworks bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the front of the discipline.
	Mathematics, natural science and engineering sciences are applied in formal analysis and modelling of engineering situations, and for reasoning about and conceptualizing engineering problems.

GA Assessment

The GA will be assessed in Module A and Module B of EEE4121F course through two projects.

EEE 4121F ASSESSMENT TASKS ('A' INDICATES MODULE-A TASKS WHILE 'B' INDICATES MODULE-B TASKS)

Week	Tests	Lab Assignments	Tutorial Assignments	Projects
Week 1 (14 Feb)				
Week 2 (21 Feb)				
Week 3 (28 Feb)			Release Assignment 1B	
Week 4 (7 Mar)		Lab Assignment 1B	Release Assignment 1A	
Week 5 (14 Mar)		Lab Assignment 1A	Release Assignment 2B	Release Project-B
Week 6 (21 Mar)	Test 1 (A&B) (22 March)			Release Project-A
Vacation (28 Mar)				
Week 7 (4 Apr)		Lab Assignment 2B		
Week 8 (11 Apr)				Project-A Hand-in 1 Project-B Hand-in 1
Week 9 (18 Apr)		Lab Assignment 2A	Release Assignment 2A and 3B	
Week 10 (25 Apr)				Project-B Hand-in 2
Week 11 (2 May)				Project-A Hand-in 2 Project-B Hand-in 3
Week 12 (9 May)	Test 2 (A&B) (10 May)			
Week 13 (16 May)				

EEE4121F Module A

"there is no future in the past"

"most students study hard for their first exam and do well, but then some being overconfident do not study as hard for the other exams and progressively do worse"

"but this one thing I do, forgetting those things which are behind, and reaching forth unto those things which are before"

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