EE4316: MOBILE DATA NETWORKS

Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Mobile Data Networks

Subject Code
EE - Electrical Engineering

Course Number
4316

Academic Unit
Electrical Engineering (EE)

College/School
College of Engineering (EG)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
EE3009 Data Communications and Networking

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
CS4284 Mobile Computing
Part II Course Details

Abstract
The aim of this course is to provide students with the knowledge of various network technologies and related protocol architectures to support mobile data communications.

Course Intended Learning Outcomes (CILOs)

<table>
<thead>
<tr>
<th>CILOs</th>
<th>Weighting (if app.)</th>
<th>DEC-A1</th>
<th>DEC-A2</th>
<th>DEC-A3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Explain the principles of cellular mobile network</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Evaluate the performance of cellular mobile networks</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Explain the design principles mobile of 802.11 WLAN</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Explain the design principles of new generations of mobile networks</td>
<td>x</td>
<td>x</td>
<td></td>
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</table>

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Teaching and Learning Activities (TLAs)

<table>
<thead>
<tr>
<th>TLAs</th>
<th>Brief Description</th>
<th>CILO No.</th>
<th>Hours/week (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lecture</td>
<td>1, 2, 3, 4</td>
<td>3 hrs/ week</td>
</tr>
<tr>
<td></td>
<td>Key concepts are described and illustrated, with related tutorial questions</td>
<td></td>
<td></td>
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</tbody>
</table>

Assessment Tasks / Activities (ATs)

<table>
<thead>
<tr>
<th>ATs</th>
<th>CILO No.</th>
<th>Weighting (%)</th>
<th>Remarks (e.g. Parameter for GenAI use)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tests (min.: 2)</td>
<td>1, 2, 3, 4</td>
<td>40</td>
</tr>
<tr>
<td>2</td>
<td>#Assignments (min.: 3)</td>
<td>1, 2, 3</td>
<td>10</td>
</tr>
</tbody>
</table>

Continuous Assessment (%)
50

Examination (%)
50
Examination Duration (Hours)
2

Additional Information for ATs
Remark:
To pass the course, students are required to achieve at least 30% in course work and 30% in the examination.

# may include homework, tutorial exercise, project/mini-project, presentation

Assessment Rubrics (AR)

Assessment Task
Examination

Criterion
Achievements in CILOs

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal levels
Part III Other Information

Keyword Syllabus

Fundamentals of Cellular Networks
Circuit Switching, Cellular Topology, Signal-to-interference ratio, FDMA, AMPS system, Capacity Expansion Techniques, Teletraffic Analysis

GSM Networks
System Architecture, Protocols, TDMA, Localization and Calling, Logical and Physical Channels

GPRS Services
Reference Architecture, Location and Handoff Management, Protocol Layers

UMTS
System Architecture, CDMA, 3.5G (HSDPA, HSUPA and HSPA)

4th Generation Systems and Beyond
System architecture, evolved packet core (EPC), OFDMA, LTE, LTE Advanced, Introduction to 5G

802.11 Wireless LAN
System Architecture, Protocol Architecture, Medium Access Control, MAC management, Security

Reading List

Compulsory Readings

<table>
<thead>
<tr>
<th>Title</th>
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<tbody>
<tr>
<td>1 Nil</td>
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</tbody>
</table>

Additional Readings

<table>
<thead>
<tr>
<th>Title</th>
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