Effective Term  
Semester A 2022/23

Part I Course Overview

Course Title  
Mobile Computing

Subject Code  
CS - Computer Science

Course Number  
4284

Academic Unit  
Computer Science (CS)

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  
CS3201 Computer Networks or  
EE3009 Data Communication Protocols or  
EE3016WANs and Communication Protocols or equivalent

Precursors  
Nil

Equivalent Courses  
Nil

Exclusive Courses  
EE4316 Mobile Data Networks
Part II Course Details

Abstract
This course studies basics and emerging topics in mobile computing, including basic communication theory of wireless mobile networks as well as the software development for mobile devices. Newly-emerging areas of mobile computing involving machine intelligence and Bot will also be studied in depth. Basics of mathematical theories and algorithms for communications will be introduced for various systems such as Internet, mobile cellular networks, wireless LAN, GPS global positioning systems. Augmented reality and QR code applications will be introduced. Software development tools for mobile apps and Bot technologies in mobile devices such as smartphones and tablets will be introduced as project-based learning.

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. Identify the basic problems, limitations, strengths and current trends of mobile computing.</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
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<tr>
<td>2. Explain the basics and fundamentals of communication theories and algorithms in mobile wireless networks.</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
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<tr>
<td>3. Create novel applications for supporting mobile computing and communications in mobile device technologies like smartphones and tablets.</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>4. Explore emerging software paradigms such as Bot in supporting mobile services with machine intelligence.</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>5. Develop an attitude to solve mobile computing problems with analytical solution and software programming development for mobile devices such as mobile apps for smartphones and tablets.</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</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 Lecture</td>
<td>The lectures will present selected networking technologies such as Internet, mobile cellular networks, WiFi networks, and the intuition and theory behind them. The algorithms will be illustrated with both toy and real-world examples to motivate the students' understanding. Implementation details will also be discussed.</td>
<td>1, 2, 3, 4, 5</td>
<td>3 hours/week</td>
</tr>
<tr>
<td>2 Tutorials</td>
<td>The students will work on problem sets during the tutorial sessions to gain better understanding of the lecture material.</td>
<td>1, 2, 3, 4, 5</td>
<td>8 hours/semester</td>
</tr>
<tr>
<td>3 Assignments</td>
<td>Students will implement selected mobile computing network algorithms, apply them to small test problems, and interpret the results. Students can then observe the effectiveness of the algorithm, and evaluate the differences between various algorithms.</td>
<td>1, 2, 3, 4, 5</td>
<td>2 hours/week</td>
</tr>
</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 Tutorial</td>
<td>1, 2, 3, 4, 5</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>2 Midterm exam</td>
<td>1, 2, 3, 4, 5</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>3 Project</td>
<td>1, 2, 3, 4, 5</td>
<td>20</td>
<td></td>
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</tbody>
</table>

Continuous Assessment (%) 
40

Examination (%) 
60

Examination Duration (Hours) 
2

Additional Information for ATs
For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.
Assessment Rubrics (AR)

Assessment Task
Tutorial

Criterion
Assignment may include short factual questions and design exercises regarding the various principles of mobile computing. Assignment may include simple project / exercises. There would also be hands-on exercises.

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

Assessment Task
Midterm Exam

Criterion
The mid-term quiz will include questions assessing the students’ understanding on networking and mobile computing.

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

Assessment Task
Project

Criterion
There would be hands-on and case study on network design in the project. Tasks may include mini programming project.
Assessment Task
Final Exam

Criterion
The final exam and mid-term quiz will include questions assessing the students’ understanding on mobile computing.

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

Syllabus
• Basic issues in mobile computing: Fundamentals of computing and communications. Mathematical analysis of communications theory. Latest development and current trends of mobile computing.
• Networking technologies: The Internet. Mobile/wireless TCP. Wireless LAN. IEEE 802.11 protocol and algorithms.
• Mobile computing: Clocks in mobile applications. GPS global positioning systems.
- Mobile computing: Mobile app software programming, Software development tools and devices. Bot software programming. Mobile software development for project-based learning

**Reading List**

**Compulsory Readings**

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<tr>
<th>Title</th>
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**Additional Readings**

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