SUBJECT DESCRIPTION FORM

Subject title: Personal Networking Technology

Subject code: EIE555

Credit value: 3

Responsible staff and department:
Dr M.Z. Wang and Dr Martin Chow, EIE

Pre-requisite:
Nil

Recommended background knowledge:
Knowledge of basic digital communications.

Mutual exclusions: Nil

Learning approach:

<table>
<thead>
<tr>
<th>Lecture/Tutorial</th>
<th>33 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstration/Laboratory Experiments</td>
<td>9 hours</td>
</tr>
</tbody>
</table>

Assessment:

<table>
<thead>
<tr>
<th>Continuous Assessment/Coursework</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Objectives:

This subject is to explain:
- Various wireless technologies for short range communications;
- Personal area networking technologies;
- Strengths and weaknesses of various personal area networking technologies;
- And to provide hands-on experience on personal area networking and development systems.
Keyword syllabus:

1. Wireless Technologies/Standards
   1.1 Time Division Multiple Access (TDMA), Time Division Duplex (TDD), and Frequency Hopping Spread Spectrum (FHSS), Direct Sequence Spread Spectrum (DSSS), Ultra Wideband (UWB);
   1.2 Bluetooth, Zigbee, UWB, IEEE 802.15;
   1.3 Ad hoc networks;
   1.4 Comparison between different technologies.

2. Bluetooth
   2.1 Architecture;
   2.2 Usage models and protocol stack; Radio, Baseband, and Link Manager and Logical Link Control and Adaptation Protocol;
   2.3 Profiles - generic, telephony, networking, serial, and object exchange.

3. ZigBee
   3.1 Architecture;
   3.2 Physical layer and MAC layer;
   3.3 Security and frame structure.

4. Ad hoc networks
   4.1 Mobile ad hoc network (MANET) fundamentals;
   4.2 Media access control;
   4.3 Routing in MANET.

5. Case Studies
   5.1 Resource for development – chipsets and development kits;
   5.2 Present and future personal networking products – PC peripherals, mobile phones, headsets and home appliances.

Indicative reading list and references:

7. C Bala Kumar, Paul Kline and Tim Thompson, Bluetooth application programming with the Java APIs, Morgan Kaufmann, 2004.

Laboratory experiments:

- Experiments on the configuration of a set of Bluetooth devices using iWRAP commands, secure pairing of Bluetooth devices, and basic Bluetooth programming, and/or similar experiments using Zigbee devices.

June 2009