**BIT 3203 Mobile Networks and Computing (4 CU)**

(a) **Course Description:** This course examines principles, design, implementation, and performance of mobile computing and wireless networking. The aim is to lay a foundation in the student's understanding and skills in mobile computing and wireless networking standards, technologies, application and services. Ideally the course is an integration of Wireless Networking and Mobile Computing. Subjects of study under Mobile Networking will include; Wireless Network technologies (including GSM/GPRS/3G & Wireless LANs), Convergence networks, NextGen, Mobile IP, wireless ATM, Wireless Ad Hoc Networks and Bluetooth. While subjects of discussion under Mobile Computing will include; Mobile Computing Architectures (including SMS/SIM, WAP, I-mode and J2ME/J2EE), mobile OS (e.g, Android) and Mobile Application Development including location–based services.

(b) **Aims**: The aims of the course include:

• To introduce students to the theory and practice of Mobile networking and computing.

• To facilitate the development of technical skills in mobile application development platforms particularly J2ME and J2EE.

• To enhance students skills in mobile application development using Java and other technologies

• To introduce students to the fundamental concepts in wireless technology and mobile

computing including standards, technologies, devices and services

• To use and experiment with new technology and cutting-edge projects

• To understand how networking research is done

• Investigate novel ideas in the area via semester-long skill development projects. (c) **Learning outcomes**: On completion of this course, the students will:

• Have gained an understanding of the theory and practical aspects of mobile computing and wireless networking.

• discuss the considerations in wireless mobile networking architectures

• to design and implement simple wireless and mobile networks using Bluetooth, Wi-Fi among others

• work with the J2ME and J2EE platforms with minimal difficulty

• develop simple mobile applications deployable on Java enabled mobile devices

• discuss the current research directions in mobile and wireless networking

• Demonstrate mastery of development and deployment of secure mobile services.

(d) **Teaching and learning patterns**: The course will be delivered inform of lectures, tutorials, lab experimentation, and group assignments

(e) **Indicative content**: **Pre-requisite**: Knowledge in the following (Computer Networking, Programming Principles, and Java )

• Introduction to mobile computing and wireless networking principles

• The BlueTooth and Zigbee short range wireless technologies

• The Wi-Fi Technologies

• Introduction to GSM/GPRS/3G/3GPP

• The Mobile IP technology

• Wireless ATM technology

• Introduction to Mobile application development

• Introduction to J2ME and J2EE platforms

• understanding mobile computing architectures (I-mode, SMS and WAP)

• Introduction to GSM gateways e.g. Kannel

(f) **Assessment method**: At least 2 (1 hour) tests and 4 practicals assignment (40% of the final course mark -practical); Class participation and lecture attendance; and a one 3 hour examination (60% of the final course mark)

(g) **Reference books**:

• Jochen Schiller, “Mobile Communications”, Addison-Wesley, 2000.

• Mark Beaulieu, “Wireless Internet Applications & Architectures: Building Professional

Wireless Applications Worldwide”, Addison-Wesley, 2002.

• Qusay H. Mahmoud, “Learning – Wireless Java”, O’Reilly, 2002.

• Introduction to Mobile Computing in Mobile Computing, edited by T. Imielinski and H.

Korth, Kluwer, Academic Publishers, 1996.

• John W. Muchow, “Core J2ME, technology & MIDP”, Prentice-Hall, 2002.

• Subrahmanyam Allamaraju, “Professional Java Server Programming J2EE 1.3

Edition”, Wrox Press Ltd, 2001.

• Steve Mann, “Programming Applications with Wireless Application Protocol”, John

Wiley & Sons, Inc., 2000.

• Scott B. Guthery and Mary J. Cronin, “Mobile Application Development with SMS and the SIM toolkit”, McGraw-Hill TELECOM, 2000.

• Neil Rbodes & Julie McKeehan, “Palm Programming: The Developer’s Guide”, O’Reilly, 1999.

• Mark Hapner, “Java Message Service API Tutorial and Reference – Messaging for the

J2EE Platform”, Sun Microsystems, 2002.