



Department of Computer and Networks

Paitaxt Technical Institute

Subject: GSM (Global system for mobile)

Course Book – Second Year

Lecturer's name: Assistant Lecturer Jabbar Majeed Sadeq

B.Sc. Kirkuk Technical college – M.Sc, Near East University-Cyprus, Nicosia,

Academic Year: 2018/2019

Course Book

1. Course name	Global system for mobile
2. Lecturer in charge	Jabbar Majeed Sadeq
3. Department/ College	Computer and Networks
4. Contact	e-mail: jabarmajid@epu.edu.krd Tel:+9647504487044
5. Time (in hours) per week	Theory: 2 for each Group
6. Office hours	wednesday 8:30-10:30
7. Course code	
8. Teacher's academic profile	Born in Kurdistan-Erbil, after finishing intermediate school attend to the high electrical industrial school, department of electronic .then completed study in the institute of technology ,after in the year 2007 had attend the technical college of Kirkuk-department of electronic and control engineering, graduated in the college year 2010 with 80.846 grade rate and second rank at the department, then studied master degree in the Near East University in Cyprus year 2013 and finished the study there year 2014 with degree at rate 91%. Worked in many different companies such VESTEL-Konika and Diawoo. Attend a session in the Omega company in India for training on communication and microwaves instruments. Have many courses in computer programs and English language.
9. Keywords	GSM architecture, BSS, NSS, and their elements
10. Course overview:	GSM is a TDMA based wireless network technology developed in Europe that is used throughout most of the world. GSM phones make use of a SIM card to identify the user's account. The use of the SIM card allows GSM network users to quickly move their phone number from one GSM PHONE to another by simply moving the SIM card. Currently GSM networks operate on the 850MHz, 900MHz, 1800MHz, and 1900MHz frequency bands. Devices that support all four bands are called quad-band, with those that support 3 or 2 bands called tri-band and dual-band, respectively. In the United States, Cingular operates on the 850 and 1900MHz bands, while T-Mobile operates only on the 1900MHz band. Also known as: "Global System for Mobile Communications", "Groupe Special Mobile
11. Course objective:	The GSM system is the most widely used cellular technology in use in the world today. It has been a particularly successful cellular PHONE technology for a variety of reasons including the ability to roam worldwide with the certainty of being able to operate on GSM networks in exactly the same way - provided billing agreements are in place.
The letters GSM originally stood for the words group Special Mobile, but as it became clear	

this cellular technology was being used worldwide the meaning of GSM was changed to Global System for Mobile Communications. Since this cellular technology was first deployed in 1991, the use of GSM has grown steadily, and it is now the most widely cell phone system in the world. GSM reached the 1 billion subscriber point in February 2004, and is now well over the 3 billion subscriber mark and still steadily increasing. Which is much like hardware and software for many other kinds of systems, we focus on the fundamental system aspects of modern digital communication. And we focus on the transmission layers and all kind of analog and digital modulations. As students learn about data communication systems and their conceptual basis in information theory, you will come to appreciate that these ideas require a fairly deep understanding of somewhat abstract concepts. Doing the problem sets is an important part of developing this understanding, but it is not sufficient. In many undergraduate engineering subjects, the emphasis (reinforced by the grading policy) is on learning to grind through the solution of a set of types of problems represented by prescribed equations

12. Student's obligation

The attendance of students in lectures will compulsory and have extra credits. The students are required to continuously follow the lectures and to submit their home works and assignments and to prepare for quizzes at any time that will be done. This is a part of evaluation and assessment.

13. Forms of teaching

Contact hours: Two theoretical weekly hours presented on power point slides and explain everything in detail for students. Question and answers then sharing students takes part in the lectures.

14. Assessment scheme

First semester Examination :

Theory:	20M
Quizzes and Attendances & Activities	5M
Total :	25M

Second semester Examination :

Theory:	20M
Quizzes and Attendances +& Activities	5M
Total :	25M

Final Examination :

Theory :	50M
Total:	100M

15. Student learning outcome:

At the end of the course, students should be able to:

1- Understand of the fundamental of GSM systems, GSM architecture , BSS configuration, NSS topology, mobile switching, call routing, signaling in GSM system, call handling, call handover and all application for GSM .

16. Course Reading List and References:

Text books	1-Michel Mouly and Marie-	2-Friedhelm Hillebrand (editor):
-------------------	---------------------------	----------------------------------

	Bernadette Pautet: GSM System for Mobile Communications, published by the authors 1992, ISBN 2-9507190-0-7	GSM and UMTS, the creation of Global Mobile Communication, Wiley 2001
References	1-www.etsi.org docbox zarchive or DVD "GSM and SMG archives 1983 – 2000" (for ETSI members)	2-1997 (End) GSM release 97 completed by ETSI TC SMG (GPRS)
Others	GSM/UMTS release 99 (LCS, UMTS Fundamentals, UTRAN) completed by 3GPP, ETSI TC SMG and ANSI T1P1	2- ETSI Technical Committee SMG agrees objectives and methodology for an open evolution of GSM beyond phase 2, to be implemented as phase 2+.

17. The Topics:	Lecturer's name
<p>1st week: Introduction to GSM overview architecture, Mobile station , base subsystem station, Network switching, Interfaces</p> <p>2nd week: Introduction to Access Network, BSS configuration, comparison of different configurations. BSS interfaces.</p> <p>3rd week: Introduction to NSS topology, Network switching system, NSS identifier.</p> <p>4th week: transmission layers</p> <p>5th week: 6th week: Mobile switching center, protocols, switching in MSC, signaling point(PS), signaling transfer point (STP), signaling link (SL) ,service switching point (SSP), call routing, circuit groups, interfaces, switch modules.</p> <p>7th week: Home location register, Mobile application protocols, signaling connection control point (SCCP), MTP(Message transfer part).</p> <p>8th week: Integrated vs standalone HLR, Visitor location register (VLR), security features, Authentication center (AUC).</p> <p>9th week: Ciphering, subscriber confidentially, Equipment identification register (EIR), Echo canceller.</p> <p>10th week: Transfer and rate adaptor unit(TRAU), operation and maintenance center (OMC), Billing center.</p> <p>11th week: Call detail record (CDRs), Gateway MSC(GMSC), Roaming number, transit switch, short message service (SMS).</p> <p>12th week: Introduction to GSM Signaling, protocols in GSM networks, MAP(Mobile Application Part), BSS Application Part (BSSAP).</p> <p>13th week: Direct Transfer Application Part (DTAP), BSS MAP, Initial MS message, LAPDM, LAPD.</p> <p>14th week: 15th week: Call signaling, BasicTypes of calls, Location registers, Location update, Normal update, IMSI Detatch& Attach</p> <p>16th week: periodic location update, Paging, PCH Dimensioning, paging control.</p>	<p>Lecturer's name: Jabbar M.Sadeq</p>

<p>17th week: Signaling interfaces, point of interconnect (POL) location, SMS point to point, Mobile terminated SMS, Mobile originated SMS.</p> <p>18th week: Handover, Intra MSC handover, Inter MS handover</p> <p>19th week: SS7, contents, introduction, signaling types, advantage of CCS7 over CAS, SS7 signaling link types, signaling network components.</p> <p>20th week: Message transfer part(MTP), Function of MTP, signaling data link(MTP level 1), signaling link functions (MTP level 2).signaling network functions(MTP level3).</p> <p>21st week: MTP user function (level4), TCAP, Global title, organization of signaling information, signal units.</p> <p>22nd week: SU delimitation, delimitation prevention, Error detection , Error correction</p>	
<p>18. Practical Topics (If there is any)</p>	
	<p>Lecturer's name</p>
<p>19. Examinations:</p> <p>1. Compositional:</p> <p>Q1. Name the protocol which is transparent to BSS and what information is used to transfer on this protocol?</p> <p>Q2. Name the protocols used between</p> <ul style="list-style-type: none"> Mobile and BTS BTS and BSC BSC to MSC MSC to PSTN <p>Q3. In How many ways BTSs can be connected and which configuration gives the optimal solution?</p> <p>Q4. What is a difference between BS interface and Abis interface?</p> <p>Q5. How many time slots are occupied by 1TRX on a PCM frame?</p> <p>Q6. Calculate the PCH requirement for following:</p> <ul style="list-style-type: none"> Number of subscriber = 75,000 Busy hour calls = 40% Assume on average 2 pages required per call 	

Safety margin for peak variation in number of calls =1.2

Paging message of type 2

Q7. Which part of the network allocates the MSRN to the call?

21. Peer review

This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.

(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor a lecturer or an expert in the field of your subject).