



Course information
Study Plan Semester (RPS)

Mobile Communication Systems

16B51C708 (Study Period 1, 2021)

Course Coordinator: Faisal Syafar

**JURUSAN PENDIDIKAN TEKNIK ELEKTRONIKA
DAN TEKNOLOGI INFORMASI
FAKULTAS TEKNIK, UNIVERSITAS NEGERI MAKASSAR**

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This *Course information* needs to be read in conjunction with *Extra course information* available at:

<https://faisalsyafar.wixsite.com/myweb/teaching/>

1. INTRODUCTION

Welcome to 16B51C708, Mobile Communication Systems. Mobile communication Systems is an important aspect in communication technology and mobile phone has become the most common tool of communication over the recent years. INTRODUCTION Several innovative improvements regarding mobile communication technologies have been made by developing various multiple-access schemes used for wireless communication (such as TDMA, FDMA, CDMA, WCDMA, etc). The big challenge is to select the right technology for the applications and systematically identify the factors that influence the overall performance.

Mobility is one of the most invigorating features, having an enormous impact on how communication is evolving into the future. Mobility in 4G networks requires new level of mobility support as compared to traditional mobility. This presentation brings about the different generations of mobile technology and identifies the different issues and challenges related to mobility management in 4G networks.

The course starts with a detailed view of the wireless propagation channel, the wireless environment and the modulation techniques used in wireless systems.

We focus on the detailed implementation of the key mobile systems, namely GSM UMTS and 4G/LTE, from the viewpoints of system architecture, the physical layer and system implementation and take a detailed look at the physical and logical channel implementation.

The 2.5 and 3.5/3.75 Generations are also discussed with a description of HSCSD, GPRS, EDGE, HSDPA and HSUPA.

Issues of network planning, mobile services and business are also considered in the module as well as the 3GPP standards defining the various mobile generations.

We have endeavored to make the course as interesting, challenging and thought-provoking as possible.

We look forward to working with you throughout the study period.

Faisal Syafar

Course Coordinator

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Jurusan Teknik Elektronika FT UNM, Parangtambung, Makassar

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CONTACT DETAILS

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TEACHING TEAM

COURSE COORDINATOR, LECTURER

Faisal Syafar^[L]_[SEP]

Muh. Ma'ruf

Muzawwirah Patawari

2. COURSE OVERVIEW

COURSE STATEMENT

Mobile communication systems have become one of the hottest areas in the field of telecommunications and it is predicted that within the next decade a considerable number of connections will become partially or completely wireless. Rapid development of the Internet with its new services and applications has created fresh challenges for the further development of mobile communication systems.

LEARNING OBJECTIVES AND GRADUATE QUALITIES

On completion of this course, the student should be able to:

On successful completion this course should enable you to:

- know and understand the engineering principles of wireless transmission, cellular systems and the different cellular/mobile systems
- analyse and calculate the path loss, fading profiles and effects of multi-path propagation in various cellular environments (based on thorough understanding of the wireless channel)
- develop a thorough knowledge of system architecture, signal formats channel structure and services for GSM, UMTS and 4G/LTE systems.
- analyse error-correcting capabilities of different forward-error correcting schemes and justify the choice of particular schemes for given applications
- understand the standardisation processes of wireless systems and the different cellular generations and be familiar with the IP issues associated with the development of technologies and standards
- compare the different cellular generations and standards in terms of capabilities, technologies (core and wireless access/physical layer), services, cost, complexity and history
- make a learned guess at what is 'next step' in cellular systems development on the basis of a thorough understanding of existing systems and of systems under development

PREREQUISITE(S)/ ASSUMED KNOWLEDGE

^[1]_[SEP]It is assumed that students have access to Mobile Technology Virtual Lab of the newest version (further details to be provided), email facilities and the Internet, either through on-campus facilities or off-campus personal arrangement. Students should have also successfully completed Fundamentals of ICT, Computer Organization and Architecture and Computer Programming (Advanced).

TEACHING AND LEARNING ARRANGEMENTS

This course is taught through:

- Lectures, (14 x 3 hours) to provide a forum for explaining the primary content. All lecture notes will be available online for both internal and external students.
- Tutorials, (TBA) to reinforce the lecture material. All tutorial material will be made available online.
- Discussion Board, to allow students and staff to debate issues related to the course.

UNIT VALUE OF COURSE

3 credit units

SPECIAL REQUIREMENTS

To obtain a passing grade in this course, students must achieve at least 40% in the Final exam.

3. LEARNING RESOURCES

TEXT(S)

You will need **continual** access to the following text(s) in order to complete this course. The library will hold one copy of the nominated text book(s) and therefore you will need to acquire the book(s).

Yoshihiko Akaiwa (2015), *Introduction to Digital Mobile Communication*. John Wiley and Sons Ltd.

MATERIALS TO BE ACCESSED ONLINE Course homepage

<https://faisalsyafar.wixsite.com/myweb>

Click the link *Study Period I 2018* under the heading *Teaching* to reach the teaching resources for Mobile Telcomm. Materials and other resources accessible from this webpage will progressively include:

Announcements^[1] Course information booklet Staff information^[1] Lecture and tutorial content^[1] Discussion room(s)^[1] Assignments^[1] Results Exam information and sample exam questions.

Please ensure that you log on to the web site **at least** a couple of times per week to check for new announcements, course material, or to participate in the discussion pages. It is YOUR responsibility to check this web site often.

This course is about technology and, accordingly, we use this very same technology to disseminate course material to students. There is limited printed course material given out to students – this applies to external students as well as internal students.

COURSE COMMUNICATION

Please post all questions with the exception of personal questions to the Internals discussion room.

If you wish to send a personal query, please use the course email address.

COURSE EMAIL ADDRESS

Students should use the following email address:

faisal.syafar@unm.ac.id

muzawwirah.patawari@gmail.com

OTHER Course RESOURCES

References

The following books are indicative of other reading and references on the discipline of systems analysis, and particularly the object-oriented approach to systems analysis and design. Not all of these books may be available in the University library and there may, in some cases, be more recent editions of these texts (in which case the more recent edition is usually preferable). You are definitely encouraged to read more widely than the set textbook.

- TG Palanivelu: Wireless and Mobile Communication (2008).
- Krzysztof Wesolowski: Mobile Communication Systems (2016).
- John B. Anderson: Bandwidth Efficient Coding (2017).
- Gordon L. Stuber: Principle of Mobile Communication (2017).
- Takehiro Nakamura: 5G Mobile and Wireless Communications (2016).

4. ASSESSMENT

ASSESSMENT SUMMARY

Form of assessment	Weighting	Due date	Graduate Quality/Qualities being assessed
Continuous tutorial assessment (quizzes)	10%	Ongoing	1, 2, 3, 4, 6
Assignment 1	10% (individual)	Wednesday 5pm Week 7	1, 2, 3, 4, 6
Assignment 2	10% (Groups)	Wednesday 5pm Week 13	1, 2, 3, 4, 6
Examination	Mid 30%	Mid Exam period	1, 2, 3, 4, 5, 6, 7
	Final 40%	Final Exam period	1, 2, 3, 4, 5, 6, 7

Please make sure you carefully read the assessment policy available on the course website.

The final grade for the course will be determined using the assessment pieces and weightings listed above. To obtain a passing grade in this course, students must achieve at least 40% in the examinations.

Note that the final mark (calculated using all components of the assessment) may be scaled (up or down) before a final grade is awarded in this course. This is done to ensure consistent standards are maintained.

You will be notified during the study period if there are any changes to the assessment criteria.

ASSESSMENT DETAILS

Details of assignment submission and return are listed under each assessment task. Assignments will be returned to you within two to three weeks of submission.

Re-submission of assignments is not available in this course.

All assignments must be submitted electronically and in hard copy.

Extensions

Extensions for assignments are available under the following conditions:

- Medical (with official doctor certificate)
- Compassionate grounds
- Permanent or temporary disability (ENTEXT card or other documentary evidence must be presented to the Course Coordinator)

Note: Equipment failure, loss of data, or 'Heavy work commitments' are not sufficient grounds for an extension. However, you may apply for an extension based on unexpected work commitments. In this case, you will need to attach a letter from your supervisor with your application. Late assignments will not be accepted unless a medical certificate (or appropriate supporting evidence) is presented to the Course Coordinator. The certificate must be produced as soon as possible and must cover the dates during which the assignment was to be attempted. In the case where you have a medical certificate, the due date will be extended by the number of days stated on the certificate, up to seven days.

Occasionally assignments go missing during submission and return. It is expected that students will make copies of all assignments and be able to provide these if required.

Students are reminded that they should be aware of the academic misconduct guidelines available from the University of South Australia website. Deliberate academic misconduct such as plagiarism is subject to penalties.

Assessment Policy

The following are assessment policies, which are common across the universities:

Deferred Assessment and Special Consideration

In the case of deferred assessment or special consideration the student must apply at the course coordinator.

- A **deferred assessment** applies to the **final assessment item** for the course. It is

granted on the basis of medical, compassionate or religious observance grounds.

- A student may apply for **special consideration** on the basis of medical, compassionate or religious observance grounds if the student believes that illness; disability through accident or other special circumstances significantly affected his or her performance in the final assessment item.

Note that special consideration will only be given to students in very exceptional circumstances.

Supplementary Assessment, Conceded Pass & Terminating Pass

Students cannot apply for a supplementary assessment, conceded pass or terminating pass. These are determined by Program Directors during the academic review process at the end of each study period. All students who are awarded a conceded pass or terminating pass will be notified immediately after the academic review.

- **Supplementary assessment** is not available in this course.

ASSESSMENTS^[L]_[SEP] Continuous Tutorial Assessment

Tutorials provide the opportunity for discussion of topics in smaller groups.

Tutorials are assessed on attendance, preparation and in-class participation (which may include both individual and group participation).

Tutorial exercises will be provided on the course web site for downloading.

Active preparation and participation in tutorials aids in the development of all the graduate qualities.

Tutorial participation develops:

- Body of knowledge through engagement with weekly exercises.
- Lifelong learning through sourcing and provision of solutions.
- Effective problem solving through solving problems.
- Work along and in teams through having sole responsibility for provision of solutions.
- Communicates effectively through the provision of solutions.^[L]_[SEP]
- Students are expected to prepare answers for all of the tutorial questions prior to every tutorial class.^[L]_[SEP] At five points of time during the study period (see schedule at the end of this booklet), you will be required to submit answers to a particular question or set of questions to that week's tutorial for marking. Further details will be provided in each of the assessable tutorials.^[L]_[SEP] All submissions must be made to your tutor prior to the commencement of the tutorial session. There will be a maximum of 5 marks given for demonstrable, written, constructive and knowledgeable preparation of each tutorial submission. A maximum of 25 marks are achievable for this component.^[L]_[SEP] Participation is required in at least five tutorial sessions. A maximum of 25 marks are achievable for this component. Hint: The more you participate, the more likely you are

of achieving maximum marks!!!! Your efforts will be recorded during the tutorial classes. If you are unable to attend a tutorial because of sickness, advise your tutor and the course email address by email beforehand and this will be taken into consideration in your mark.

Assignment 1

Assignment details will be available on the Course Website. The Graduate Qualities being assessed by this assignment are:

- operates effectively with and upon a body of knowledge of sufficient depth to begin professional practice
- is prepared for life-long learning in pursuit of personal development and excellence in professional practice
- is an effective problem solver, capable of applying logical, critical, and creative thinking to a range of problems
- can work both autonomously and collaboratively as a professional
- communicates effectively in professional practice and as a member of the community

The assignment should be submitted via email or online.

Assignments will be returned to you within two to three weeks of submission.

Assignment 2

Assignment details will be available on the Course Website. The Graduate Qualities being assessed by this assignment are:

1. operates effectively with and upon a body of knowledge of sufficient depth to begin professional practice
2. is prepared for life-long learning in pursuit of personal development and excellence in professional practice
3. is an effective problem solver, capable of applying logical, critical, and creative thinking to a range of problems
4. can work both autonomously and collaboratively as a professional
5. communicates effectively in professional practice and as a member of the community

The assignment should be submitted via email or online.

Assignments will be returned to you within two to three weeks of submission.

Assessment grades

Grades corresponding to marks are as follows:

Grade	Notation	Notational %
High distinction	A	86-100
Distinction	B	76-85
Credit	C	61-75
Pass level 1	D	56-60
Fail	E	Below 55

Assignment Assessment Criteria

Assessment of your assignments will take into account a number of criteria. The following criteria are indicative of the range and type of criteria that may be applied. The list is not meant to be necessarily exhaustive.

1. Relevance of your answer to the question or task set.
2. The extent to which assignment questions are answered fully.
3. Clarity of written expression.
4. Supporting documentation for arguments and the use of case studies to illustrate your understanding of the relevant concepts.
5. Proper use of referencing—that is, appropriate acknowledgment of the work of other authors and use of a bibliographic convention.
6. Critical analysis capabilities where applicable and the capabilities to suggest problems, pitfalls, limitations, potentially productive future new directions, practical application of concepts, and the like.
7. Logical planning and sequence.
8. Use of inclusive language.
9. Overall presentation, including correct grammar, spelling and punctuation.
10. Comprehensive coverage reflecting engagement with set readings, text(s) and other relevant materials.

Exam/Test

Both the MID test and FINAL exam will assess all material presented during the study

period (lecture material, assignment, tutorial work, etc), unless otherwise specified.

The duration of the exam will be 10 minutes reading time followed by 90 minutes exam time.

The standards by which the exam will be assessed are:

- Answers must be clearly expressed and relevant to the question.
- Answers must be readable.
- Answers that have been crossed out will not be marked.
- To obtain a passing grade in this course, students must achieve at least 40% in the exam. ^[L]_[SEP]The examination is ‘open-book’ only to the extent that students are permitted to take hand-written notes into the examination (maximum of 10 A4 single sided pages), but no other material including word-processed notes, textbooks, or calculators. These items must not be enhanced or tampered with in any way.

Students with disabilities ^[L]_[SEP]

Students with disabilities may be entitled to a variation or modification to standard assessment arrangements.

VARIATIONS TO ASSESSMENT TASKS ^[L]_[SEP]

Students may request a variance to assessment methods, tasks and timelines based on medical, compassionate or religious observance grounds, or community services. Such variations must be requested within the first two weeks of the course (or equivalent for accelerated or intensive teaching). Alternative arrangements due to unexpected circumstances should be discussed with the Course Coordinator as required.

ACADEMIC INTEGRITY

The study program of PTA is committed to academic integrity and has policies and procedures in place to ensure academic integrity and manage academic misconduct for all students.

Academic misconduct includes:

- Plagiarism
- Breaches of the examination procedures.
- Inclusion of material in individual work that has involved significant assistance from another person, where such assistance is not expressly permitted in this booklet.
- Falsification or misrepresentation of academic records.

Other actions that contravene the principles of academic integrity. ^[L]_[SEP]Students' work may be checked for plagiarism using a variety of means, including text comparison software. Assignments checked electronically will be held in a database for future matching processes. ^[L]_[SEP]

EVALUATION OF THE COURSE ^[L]_[SEP]

We are committed to ensuring continual improvement of this course. During the study period, please feel free to send feedback to staff via the discussion boards or the Course email account ([will be provided at course coordinator's website](#)) Please let us know of any errors in lecture slides, tutorials, solutions, etc. ^[L]_[SEP]At the end of the study period, online questionnaires will be available for you to evaluate the course and the teaching staff. Your feedback is extremely valuable and your comments remain anonymous. You are required to log on to the system to maintain its integrity (so that only students actually enrolled in a class can evaluate it, and so that each person can only complete a questionnaire once), but your identity is not associated with your responses.

This feedback is read and used to improve the course and the skills of the teaching staff.

Results of past feedback have been incorporated into the course in changes such as:

- Revising the amount of assessable tutorial materials to be submitted.
- Providing more practical examples during lectures.

5. COURSE CALENDAR

STUDY PERIOD 1, 2021

The following lecture and tutorial schedule is a guide only. You will be notified during the study period if there are any changes to the schedule.

Week	Dates	Topic	Tutorial (Tentative)	Assessment
1	18 August	Introduction to This Course, Introduction to Wireless & Mobile Network		
2	25 August	Wireless Transmission		
3	1 Sept	Media Access	VOIP on IPQs	
4	8 Sept	Wireless Telecommunication Systems (Part 1)		
5	15 Sept	Wireless Telecommunication Systems (Part 2)		
6	22 Sept	Wireless LAN (Part 1)		
7	29 Sept	Wireless LAN (Part 2)	Ad hoc Routing	Assignment 1 Due
	6 Oct	<i>Mid Test</i>		
8	13 Oct	Network Protocol		
9	20 Oct	Mobile IP		
10	27 Oct	Mobile Transport Layer	Mobile IP	
11	3 Nov	Support for Mobility		
12	10 Nov	1G to 5G Cellular		
13	17 Nov	Trending Topic of Mobility	Vehicular Communications	
14	14 Nov	Trending Topic on Mobility		Assignment 2 Due
	1-16 December	<i>Final Test</i>		