

1.	Name of Course					Wireless Communication	
2.	Course Code					JWCM5213	
	JWCS = the first alphabet identify the faculty within which the subject is offered., JWCS = the remaining three alphabet identify the course that offers the subject, 5213 = the first digit identify level of study; in this case undergraduate level, 5213 = the second and third digits identify subject identity and 5213 = the fourth digit identify credit value or credit hours						
3.	Name(s) of academic staff					To be Assigned	
4.	Rationale for the inclusion of the course/module in the programme					Knowledge of wireless communication is essential in electrical and electronic engineering. Moreover, acquiring knowledge in communication enable engineer to design communication system	
5.	Semester and Year offered					Year 4, Semester 2	
6.	Total Student Learning Time (SLT)		Face to Face				Total Guided and Independent Learning
	L = Lecture T = Tutorial P = Practical IS= Independent Study		L	T	P	IS	Total Guided and Independent Learning = 120
			42	7	6	65	
7.	Credit Value					3.0	
	Lecture: 3 hours per week x 14 weeks Tutorial: 1 hour per week x 7 weeks Practical: 2 hours x 3 weeks						
8.	Prerequisite (if any)					JACO1053: Analog Communication	
9.	Course Objectives Course Learning Outcomes (CLO) At the end of the semester students should be able to: CLO1: Explain a typical mobile communication system, analyse and design mobile wireless communication; CLO2: Design and apply the cellular concept and analyse the issues in mobile radio propagation; CLO3: Describe and analyse the modulation technique and mobile communication;						
10.	Transferable Skills: This course is expected the development of the following transferable skills: - An ability to manage time and task - An ability to learn both independently and co—operatively; - An ability to take responsibility and carry out laboratory test; - An ability to take initiative and lead other; - An ability to use software where relevant to the subject.						
11.	Teaching-learning and assessment strategy A variety of learning strategies are used throughout the course, including the following - Classroom Lesson; Lecturer and power point presentation - Tutorial session - Student- lecturer Discussion - Collaborative and co-operative learn; - Independent study.						

	Assessment: <table><tr><td>Course works</td><td>40%</td></tr><tr><td>Assignment</td><td>5%</td></tr><tr><td>Tutorial</td><td>5%</td></tr><tr><td>Quizzes</td><td>5%</td></tr><tr><td>Laboratory works</td><td>10%</td></tr><tr><td>Test</td><td>15%</td></tr><tr><td><u>Final Examination</u></td><td><u>60%</u></td></tr><tr><td><u>Total</u></td><td><u>100%</u></td></tr></table>	Course works	40%	Assignment	5%	Tutorial	5%	Quizzes	5%	Laboratory works	10%	Test	15%	<u>Final Examination</u>	<u>60%</u>	<u>Total</u>	<u>100%</u>
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12.	Synopsis: This course is very important course in the field of electrical and electronics engineering. The objective of course is to introduce students to wireless communication system.																
13.	Mode of Delivery: Lectures; Tutorials; Laboratory works																

14.	Assessment Methods and Types:						
	Performance Criteria :						
	CLO-PLO	Assessment Tool	1	2	3	4	5
	Marks		0-39	40-49	50-59	60-74	75-100
	Grade		(F)	(D,D+)	(C-,C,C+)	(B-,B,B+)	(A-,A,A+)
	CLO1: Explain a typical mobile communication system, analyse and design mobile wireless communication;	Assignment Tutorials Lab works Quizzes Test Examination	Fail To: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	Poor To: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	Satisfactory To: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	Good To: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	Excellent To: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test
	CLO2: Design and apply the cellular concept and analyse the issues in mobile radio propagation;	Assignment Tutorials Lab works Quizzes Test Examination	Fail To: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	Poor To: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	Satisfactory To: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	Good To: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	Excellent To: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test
	CLO3: Describe and analyse the modulation technique and mobile communication;	Assignment Tutorials Lab works Quizzes Test Examination	Fail To: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	Poor To: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	Satisfactory To: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	Good To: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	Excellent To: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test

15. Mapping of the Programme Objectives to the Programme Learning Outcomes

[illegible]

16.	Mapping of the course Learning Outcome to the Programme Outcome										
Programme Learning Outcomes (PLO) Course Learning Outcome (CLO)	PLO1: Ability to acquire and apply knowledge of science and engineering fundamentals.	PLO2: Acquired in-depth technical competence in electrical engineering discipline.	PLO3: Ability to undertake problem identification, formulation and solution;	PLO4: Ability to utilise systems approach to design and evaluate operational performance.	PLO5: Understanding of the principles of design for sustainable development;	PLO6: Understanding of professional and ethical responsibilities and commitment to them.	PLO7: Ability to communicate effectively, not only with engineers but also with the community at large.	PLO8: Ability to function effectively as an individual and in a group with the capacity to be a leader or manager;	PLO9: Understanding of the social, cultural, global and environmental responsibilities of a professional engineer	PLO10: Recognising the need to undertake lifelong learning, and possessing/acquiring the capacity to do so.	PLO11: Ability become entrepreneur
	CLO1: Explain a typical mobile communication system, analyse and design mobile wireless communication;	✓	✓	✓	✓						
	CLO2: Design and Apply the cellular concept and analyse the issues in mobile radio propagation;	✓	✓	✓	✓						
	CLO3: Describe and analyse the modulation technique and mobile communication;	✓	✓	✓	✓						

17. Content outline of the course/module and the SLT per topic						
Details		SLT(Hour)				
		L	T	P	IS	Total
Topic 1	Introduction to Wireless Communication Systems: - Types of Wireless Communication Systems, Evaluation of Mobile Radio Communications. - Mobile Radio systems as used around the world; Paging systems, cordless systems, cellular systems, comparison of common mobile radio systems, trends in cellular radio and personal communications.	6	1	-	10	17
Topic 2	The Cellular Concept: - Introduction and Frequency Reuse, Sectorization, Channel Assignment strategies, Handoff, Strategies, Interference and System Capacity, - Trunking and Grade of Service, Improving Capacity in Cellular systems pulse Shaping	6	1	-	10	17
Topic 3	Radio Propagation: - Basic of Free space propagation model, Reflection, Diffraction, Scattering, Practical Link Budget Design using Path Loss Models, Hata Model for Outdoor propagation, Indoor propagation, Impulse response model of a multipath channels, Parameters of mobile multipath channels, coherence bandwidth, coherence time, type of small scale fading, Rayleigh and Rician fading distribution, statistical models for multipath fading channels. - Impulse response model of a multipath channels, Parameters of mobile multipath channels, coherence bandwidth, coherence time, type of small scale fading, Rayleigh and Rician fading distribution, statistical models for multipath fading channels.	12	2	-	16	30
Topic 4	Modulation Techniques for Mobile Radio: Techniques of frequency modulation vs. amplitude modulation, digital modulation, pulse shaping techniques, geometric representation of modulation signals, linear modulation techniques (BPSK, DPSK, QPSK, offset QPSK, MSK, GMSK, MPSK, QAM),. Spread spectrum modulation techniques, modulation performance in fading and multipath channels.	9	2	-	13	24
Topic 5	Multiple Access Techniques for Wireless Communications: Multiple Access Techniques of FDMA, TDMA, Spread spectrum Multiple Access, FHMA, CDMA, Space division MA,. packet radio protocols, Carri+ers sense Multiple Access(CSMA) protocols and Capacity of cellular systems	6	1	-	10	17

	Topic 6	Wireless Systems and Standards: GSM and 3rd generation CDMA techniques and Wi-Fi	3	-	-	6	9
	Practical	1. Techniques of Frequency modulation vs. amplitude modulation, 2. digital modulation, pulse shaping techniques, 3. geometric representation of modulation signals, 4. linear modulation techniques (BPSK, DPSK, QPSK, offset QPSK, MSK, GMSK, MPSK, QAM),	-	-	6	-	6
	Total SLT (Hour)		42	7	6	65	120
18.	Main references supporting the course - Andara Goldsmith, Wireless Communications, Cambridge University Press, 2005 - heodore S. Rappport, Wireless Communications: Principles and Practice, 2nd ed., Prentice Hall, 2007 - William Tranter, K Shanmugam, Theodore Rappaport, Kurt kosbar, Principles of Communication Systems Simulation with Wireless Applications, Prentice Hall, 2008						
	Additional references supporting the course						
19.	Other additional information All materials will be available to the students in the library.						