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Department of Electrical Engineering	
Electronics for Communications (63413)	
Total Credits	**3**
major compulsory	
Prerequisites	P1 : Electronic Circuits III (63412)

Course Contents

In this course, students are introduced to introduction to radio communication system, properties of LC circuits - review, frequency selective networks, resonant circuits, high frequency amplifiers and Automatic Gain Control (AGC), oscillators, Voltage Controlled Oscillators (VCO), modulators and demodulators, Phase Locked Loops (PLL) circuits specifications.

	Intended Learning Outcomes (ILO's)	Student Outcomes (SO's)	Contribution
1	Ability to use mathematics to study the noise, noise figure in electronic components and their effect on system performance	A	10 %
2	Ability to design radio receivers components such as mixers, oscillators, VCO, PLL and AGC systems and select various architecture based on the application	C	50 %
3	Ability to minimize noise due to electronic components using LNA at the first stage of the receiver	E	20 %
4	Compare analog down conversion receivers with their digital counterparts	J	10 %
5	Ability to use modern software tools such as ADS or work bench in the design of mixers, oscillators, VCO, PPL and AGC systems	K	10 %

Textbook and/ or Refrences

1. Modern communication circuits, Jack Smith 1986. 2. Razavi, Behzad. RF Microelectronics. Upper Saddle River, NJ: Prentice Hall, 1998. ISBN: 0138875715 3. Gonzalez, Guillermo. Microwave Transistor Amplifiers: Analysis and Design. Upper Saddle River, NJ: Prentice Hall, 1996. ISBN: 0132543354. (available at Amazon).

Assessment Criteria	Percent (%)
First Exam	20 %
Second Exam	20 %
Projects	10 %
Final Exam	50 %

Course Plan

Week	Topic
1	1. Revision of Random process (a) Mathematical definition of random process (b) Stationary process (c) Mean, Correlation, and Covariance functions (d) Ergodic process (e) Transmission of a Random process Through a linear time invariant filter (f) Power spectral density (g) Gaussian process
2	(a) Quantization process (b) Pulse code modulation (c) Noise considerations in PCM systems
3	(a) Time division multiplexing (b) Digital multiplexers
4	Delta modulation and differential pulse code modulation
5	Matched filter

6	MIDTERM EXAM 1
7	Error rate due to noise and Intersymbol interference
8	Nyquists criterion for distortion less base band binary transmission. Baseband M-ary PAM transmission. Digital subscriber lines.
9	Passband transmission model. Coherent phase shift keying
10	Hybrid amplitude/Phase modulation schemes (QAM)
11	Coherent Frequency shift keying
12	MIDTERM EXAM 2
13	Non coherent orthogonal modulation
14	Non coherent binary FSK
15	Differential phase shift keying
16	Final Exam