Course Details

Course Title:	Advance Wireless System	**Module:**	3
Instructor:		**Total Marks:**	50

Student Details

Name:		**Student ID:**	

INSTRUCTIONS:

1. The solution must be uploaded before the end of deadline mentioned on the _Online Portal_ of subject.

Question 1 **(10)**

In a wireless communication system with impulse response of wireless channel as $h(t)$, a signal $x(t) = \delta(t - t_0)$ is desired to be transmitted. Assume isotropic scattering conditions to develop rayleigh fading model (NOLOS) for the communication between transmission and receiving ends in terms of $r_\ell(t)$ and $c_\ell(t)$. Also present the Jake's spectrum.

Question 2 **(10)**

Use the Okumura-Hata model to calculate the average path loss for a cellular system in a large city at 1 and 2 km distance. Assume the following

Parameters:

$$h_b = 100 \text{ m}, \qquad h_m = 2 \text{ m}, \qquad f_c = 1 \text{ GHz}$$

Question 3 **(10)**

In HiperLAN, various QAM constellations are used. The bits are mapped on the QAM signals based on Gray codes. Describe what a Gray code is and explain why such codes are used together with QAM.

Question 4   **(10)**

Find a generator polynomial of a triple-error-correcting RS code of length 63 over $\mathbb{F}64$. Elements in this field should be given as polynomials in x of smallest degree.

Question 5   **(10)**

A convolutional code is defined by the generator matrix

$$G(D) = \left(1, \ 1 + D, \ 1 + D + D^2, \ 1 + D + D^2 + D^3\right)$$

a) Determine the rate of the code.
b) Draw the corresponding encoder.
c) Determine the free distance of the code.