

## **Circularly Polarized Filtering Antenna for UHF RFID System**

### **Project Overview**

RF front ends are an essential component of any wireless system, and a goal of any designer to have an efficient, lossless and compact design. The goal of this project is to replace the filter and antenna that exist in any RF front end with a single antenna that do filtering at the same time. The project will focus on design, simulation and realization of a circularly polarized filtering antenna for UHF RFID system that is being developed.

### **Eligible Departments:**

Electronics	
Communications	<b>X</b>
Networking	

### **Software/Hardware:**

CST

### **Relevant Courses:**

Waves, Radio Frequency

### **Relevant References:**

Z. Jiang, D. Werner, "A compact, wideband circularly polarized co-designed filtering antenna and its applications for wearable devices with low SAR", IEEE trans. on antennas and propagation, Vol 63, No. 9, Sept. 2015, page 3808-3818

## **Compact Narrow Band Bandpass Filter with high insertion loss Characteristics**

### **Project Overview:**

3D printing technology opened very wide possibilities in different engineering and scientific branches. One of these branches is the RF and microwave components designs and their fabrication. In this project the aim will be to design, simulate and realize a 3D compact band pass filter based on 3D printing technology at UHF band for RFID systems.

### **Eligible Departments:**

Electronics	
Communications	<b>X</b>
Networking	

### **Software/Hardware:**

CST

### **Relevant Courses:**

Waves, Radio Frequency

### **Relevant References:**

C Guo, X Shang, M. Lancaster, & J Xu, "A 3-D printed lightweight x-band waveguide Filter based on spherical resonators", IEEE Microwave and Wireless components letters", Vol 25, No. 7, July 2015, page 442-444

## **Wearable Antenna of LoRa Sensor (Co-Supervised Dr. Tallal Elshabrway)**

### **Project Overview:**

We are in the era of IoT (internet of things), where millions and millions of sensors will be connected to the internet directly. One of the promising standards of these IoT systems is the LoRa systems. And one crucial application for sensor networks is the BAN (Body area networks) where human vital signs can be monitored and transmitted directly to the medical institutes. Accordingly in this project the goal would be to design, simulate and realize a wearable BAN antenna that can be connected to a LoRa based sensor system.

### **Eligible Departments:**

Electronics	
Communications	<b>X</b>
Networking	

### **Software/Hardware:**

CST

### **Relevant Courses:**

Waves, Radio Frequency

### **Relevant References:**

P. Torre, T. Ameloot, & H. Rogier “Wearable 868 MHz LoRa Wireless Sensor Node on a substrate integrated waveguide antenna platform”, Proceedings of the 49<sup>th</sup> European Microwave Conference

L. Trinh, T. Nguen, H. Nguyen, N. Truong, and F. Ferrero, “ Low-profil horizontal omni-directional antenna for LoRa wearable devices”, 2017 International Conference on Advanced Technologies for communications.