



# COLLEGE OF ENGINEERING & TECHNOLOGY

Department: Electronics and Communications Engineering, Cairo

## Graduation Project Description Form

Project Title: **Cooperative spectrum sensing and spectrum sharing  
Techniques in Cognitive Radio Systems**

Duration from mo/year \_\_\_\_\_ till mo/year \_\_\_\_\_

Project Supervisor(s): **Prof. Dr. Said E. El-Khamy**

### Product Category

Algorithm \_\_\_\_\_ Hardware \_\_\_\_\_ Software \_\_\_\_\_

### Standards:

Safety: UL, CE \_\_\_\_\_ IEEE \_\_\_\_\_ FCC \_\_\_\_\_ Other \_\_\_\_\_

### Practical Realization Form

PCB \_\_\_\_\_ Firmware \_\_\_\_\_ Embedded CPU Kit (ARM, ..etc): \_\_\_\_\_

PC Software \_\_\_\_\_ Ready-made Package \_\_\_\_\_ DSP Kit \_\_\_\_\_ FPGA Kit \_\_\_\_\_

VLSI Schematics \_\_\_\_\_ VLSI Layout \_\_\_\_\_ VLSI Silicon (ASIC) \_\_\_\_\_

### Language

VHDL/Verilog \_\_\_\_\_ Matlab \_\_\_\_\_ C/C++/Java \_\_\_\_\_

### Productization

Finished Product Form: \_\_\_\_\_ Possible Commercialization \_\_\_\_\_

Amount of funds needed for buying components: \_\_\_\_\_

IEEE GOLD Made-In-Egypt/Engineering Day: \_\_\_\_\_

ITAC (ITIDA) or NTRA Funding Application: \_\_\_\_\_

### Testing

Functional \_\_\_\_\_ Simulation \_\_\_\_\_ Parameters \_\_\_\_\_ Final Hardware \_\_\_\_\_ Other: \_\_\_\_\_

### Lab Test Setup

EMC \_\_\_\_\_ Environmental \_\_\_\_\_ Microwave \_\_\_\_\_ Analog Lab \_\_\_\_\_ Other: \_\_\_\_\_

**CAD Tools** (No unauthentic software is allowed):

**Elective Classes Required:**



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### Abstract

Cognitive radio is an exciting emerging technology that has the potential of dealing with scarcity of the radio spectrum. It allows the dynamic and efficient utilization of the radio spectrum by offering distributed terminals the ability of radio sensing and dynamic spectrum sharing. Multiple secondary users can use cooperative techniques to improve the utilization of the primary user band without affecting its performance. Through some distributed transmission or signal processing, cooperative users collaborate so as to realize a new form of space diversity to combat the effects of fading channels and make efficient and dynamic spectrum sensing and spectrum sharing. The project will study these techniques and evaluate their performance through detailed analysis and MATLAB simulations.



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References and Links