



COLLEGE OF ENGINEERING & TECHNOLOGY

Department: Electronics and Communications Engineering, Cairo

Graduation Project Description Form

Project Title: Compact Microwave Filters for Wireless Communication Applications

Duration from mo/year till mo/year

Project Supervisor(s): Dr M abdalah

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

Microwave filters are extensively used in all modern communications, radar, guidance, and electronic warfare systems as an essential part for controlling the frequency response in a microwave system by providing a good transmission for the desired frequencies (within the pass band of the filter) and rejection of undesired frequencies (in the stop band of the filter).

Recently, it has been illustrated that metamaterial can illustrate unusual guided-wave and radiated-wave characteristics. As a consequence, many novel planar metamaterial microwave components have been proposed by different groups all over the world for various microwave applications. Examples of these microwave devices comprise filters, couplers, resonators, transformers, phase shifter, antennas. All of these devices are famous for introducing size reduction and performance enhancement compared with their common technology versions.

The proposed project is to design and implement a microwave filter based on the use of most advanced electromagnetic techniques, example, metamaterial, electromagnetic bandhgap, ...etc.

During this project, an extensive literature survey will be done on different



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microwave filters configurations and structures. Finally, a compact bandpass filter for different wireless communications will be proposed. The proposed filter design will be discussed, verified using possible electromagnetic simulations, and confirmed by practical measurements. Simulation and measurement results for different filter parameters should be pointed out.

تجد مرشحات الميكروويف استخدامات مكثفة في جميع أنظمة الاتصالات, الرادار, التوجيه والحرب الالكترونية الحديثة كجزء أساسي من النظام يعمل على التحكم في التردد العامل بإمرار الترددات المطلوبة و إيقاف الترددات الغير مرغوب فيها.

(تتميز بخصائص فريدة لاستخدامها في التطبيقات المختلفة لدوائر **metamaterials** المواد المستحدثة)
الميكروويف المختلفة.

كذلك في السنوات القليلة الأخيرة حدث تقدم مثير في مجال استخدام برامج التصميم بواسطة الحاسب الآلي في تصميم وتحليل الدوائر والنظم الميكروموجية.

(**metamaterial** المشروع يهدف الى تصميم وتنفيذ مرشح موجات مبنى على استخدام المواد المستحدثة)
كذلك سوف يتم تصنيع هذه الدوائر في صورة دوائر شريطية وقياس خواصها و مقارنتها بنتائج التحليل.



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References and Links