射頻產品天線設計課程

ANTENNA DESIGN FOR RADIO FREQUENCY (RF) PRODUCTS

簡介

在今天的營商環境，無線通信產品必須在短時間推出市場，才能維持競爭力。新產品能否成功打入市場，因射頻設計，特別是天線，會影響產品的通信範圍，故此尤為關鍵。優良的天線設計，能為射頻產品設計或製造商，創造競爭優勢。

課程宗旨

本課程為期兩天，旨在提升參加者的天線設計技術，在實用及工業層面，了解切實可行的天線設計技術元素。

課程涵蓋基本天線概念和定義、常用射頻產品天線之特色、規格及性能，並會教授實用的產品設計之元素。課程另設討論環節，以加深參加者對實用天線測量和測試的認識。Agilent Technologies Hong Kong Ltd.亦會示範阻抗測量和天線匹配。

本課程由經驗豐富的射頻專家教授，透過本課程參加者可提升射頻產品設計技術，設計出高性能之產品，並能把設計疊代次數減至最少。

課程對象

射頻設計師、無線產品設計師、應用工程師、設計經理、業務發展工程師及經理，以及相關行業專家。

上課日期

2010 年 6 月 18-19 日 (星期五及六)

上課時間

9:30am – 5:00pm

課程費用

- 港幣$2,500
- 於 2010 年 6 月 4 日前報名並繳交費用 : 港幣$2,250

INTRODUCTION

Shorter time-to-market for wireless communication products is necessary to secure competitiveness in today's business environment. Playing a critical role in determining the communication range of products, RF design, antenna in particular, becomes crucial to the success of the introduction of new RF products. Competency on antenna design definitely strengthens the competitive edge of RF product design or manufacturing companies.

COURSE OBJECTIVES

This 2-day course aims to provide participants with technical insights on some vital aspects of antenna design from a practical and industrial perspective. The course covers the fundamental antenna concepts and definitions, introduction of features, specifications and performance of different types of commonly used antennas in RF products and practical products design elements. To enhance participants' knowledge on practical antenna measurement and testing, a discussion will be held. Impedance measurement and matching of antennas will also be demonstrated by Agilent Technologies Hong Kong Ltd.

Conducted by RF experts with the wealth of local and overseas industrial experience, the course provides information for participants to develop top-performance RF products with the fewest number of design iterations.

WHO SHOULD ATTEND

RF designers, wireless product designers, field application engineers, business development engineers and managers, design managers, and related professionals.

DATE

18-19 June 2010 (Friday & Saturday)

TIME

9:30am – 5:00pm

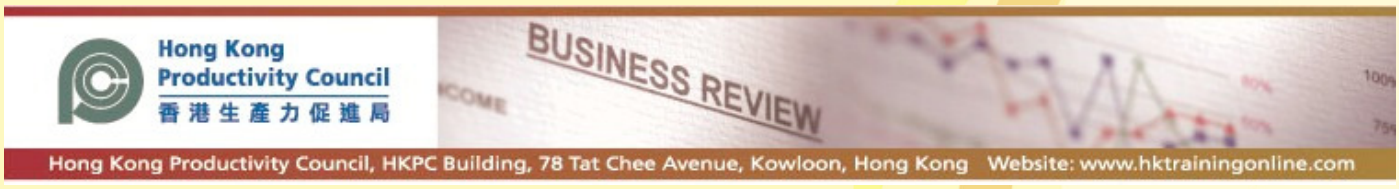
COURSE FEE

- HK$2,500
- Early Bird: $2,250 (Register and pay on or before 4 June 2010)

主辦機構 Organizer PRODUCTIVITY 生產力培訓學院 Training Institute

協辦機構 Co-organizer LEXIWAVE Reinventing RFIC

支持單位 Supported by Agilent Technologies



課程內容

COURSE CONTENT

第 1 天 (6 月 18 日)	Day 1 (18 June)
1. 天線基本理論 ◆ 天線類型 ✧ 磁單極天線、螺旋狀天線、環狀天線、電路板 ◆ 輻射機制 ✧ 輻射的來源 ✧ 輻射的特徵 2. 規格和性能 ◆ 輻射模式 ◆ 天線的效率及孔徑 ◆ 阻抗及線路匹配 ◆ 方向性及增益 ◆ 弗里斯 (Friis) 傳輸公式 3. 選擇天線 ◆ 磁單極天線 ◆ 橡膠迷你天線 ◆ 金屬片專用天線 ◆ 微型晶片型的天線 ◆ 環形天線 4. 天線設計要點 ◆ 天線大小和厚度 ◆ 安裝和銲接 ◆ 預防靜電損害	1. Antenna Fundamentals ◆ Types of Antenna ✧ Monopole, helical, loop, printed PCB ◆ Radiation Mechanism ✧ Source of radiation ✧ Characteristics of radiation 2. Specification and Performance ◆ Radiation pattern ◆ Antenna efficiency, aperture ◆ Impedance and circuit matching ◆ Directivity, gain ◆ Friis Transmission Equation 3. Selection of Antenna ◆ Monopole antenna ◆ Rubber ducky antenna ◆ Case-fit metal plate antenna ◆ Miniature chip type antenna ◆ Loop antenna 4. What Makes a Good Antenna ◆ Antenna size and thickness ◆ Mounting and soldering ◆ Electrostatic damage prevention

第 2 天 (6 月 18 日)	Day 2 (19 June)
5. 天線設計之工作環境 ◆ 最佳的地點 ◆ 到線路版的距離、電池和金屬部件 ◆ 手效應及頭效應 ◆ 射頻線纜和連接器 6. 產品設計師、電子工程師和機械工程師的配合工作 ◆ 合作之重要性 ◆ 天線設計實踐 7. 天線阻抗匹配 ◆ 阻抗匹配之方法 ◆ 匹配網絡元素 8. 使用網路分析儀測量天線參量 ◆ 2D 天線增益/樣式測量 ◆ 3D 天線增益/樣式測量 ◆ RFID 13.56MHz/UHF 天線阻抗/增益測量 9. 測量示範 ◆ VHF/UHF 天線 ◆ UWB 天線	5. A Good Working Environment for Antenna Design ◆ Best location ◆ Distance to PCB, battery and metal object ◆ Hand effect and head effect ◆ RF cables and connectors 6. Working together with product designers, electronic engineers and mechanical engineers ◆ Why it matter ◆ Practice on designing a good antenna 7. Impedance Matching for Antenna ◆ Different matching methods ◆ Elements of matching network 8. Antenna Parameter Measurements with Network Analyzer ◆ 2D Antenna Gain/Pattern Measurement ◆ 3D Antenna Gain/Pattern Measurement ◆ RFID 13.56MHz/UHF Antenna Impedance/Gain Measurement 9. Measurement Demonstration ◆ VHF/UHF Antennas ◆ UWB Antenna

講者簡介

袁仲明博士在香港城市大學獲得電子工程學學士及博士學位，主要研究範疇為低電壓及低功耗無線系統的射頻和微波電路設計。他在香港和中國內地的射頻產品設計和生產行業擁有二十多年經驗。袁博士現任 HDTV 和 IPTV 領域之顧問工程師。

劉善啟先生先後於英國及美國取得電子工程學碩士及工商管理碩士學位。他在香港及美國有超過二十年射頻系統、產品設計和 RFIC 的經驗。他曾在美國 Motorola 和 Conexant 任職主任工程師多年，主要從事手機的 RFIC 和矽材料調頻器開發。劉先生擁有五個美國專利，並有一個專利在審理中。他現時在香港開設無晶圓半導體公司——「立聲威科技(香港)有限公司」，公司主要業務為 RFIC 設計及銷售。

授課語言

廣東話（輔以英文詞彙）

上課地點

九龍達之路 78 號生產力大樓一樓

證書頒發

完成課程之學員可獲發出席證書

報名方法

請填妥報名表格，並連同支票送交香港生產力促進局。

地址：九龍塘達之路78號生產力大樓三樓

生產力培訓學院(3702) 葉小姐收

**支票請劃線，抬頭為「香港生產力促進局」*

查詢

香港生產力促進局

葉小姐

電話：2788 6366　　電郵：hollyip@hkpc.org

楊小姐

電話：2788 5833　　電郵：mcy@hkpc.org

網址：www.hktrainingonline.com

Lexiwave Technology (Hong Kong) Ltd.

劉先生

電話：2144 2592　　電郵：henry.lau@lexiwave.com

ABOUT THE INSTRUCTORS

Dr. C.M. Yuen received his B.Eng. and Ph.D degrees in Electronic Engineering from the City University of Hong Kong. His research interest mainly lies in RF and Microwave circuits design for low voltage and low power consumption wireless systems. He has twenty-year experience in RF product design and manufacturing in Hong Kong and Mainland China. Dr Yuen is currently an advisory engineer in the field of HDTV and IPTV.

Mr. Henry Lau received his M.Sc. and MBA degrees from UK and USA respectively. He has more than 20 years of experience in designing RF systems, products and RFICs in both Hong Kong and US. He worked for Motorola and Conexant in US as Principal Engineer on developing RFICs for cellular phone and silicon tuner applications. Mr Lau holds five US patents and has one patent pending. He is currently running Lexiwave Technology Ltd., a fabless semiconductor company in Hong Kong and US designing and selling RFICs.

MEDIUM OF INSTRUCTION

Cantonese (with English terminology)

VENUE

1/F., HKPC Building, 78 Tat Chee Avenue, Kowloon

AWARD OF CERTIFICATE

A Certificate of Completion will be awarded to participants who have attended through the 2-day training

APPLICATION PROCEDURE

Please complete the attached enrolment form and send it together with the appropriate fee to the Hong Kong Productivity Council at the following address:
Ms Holly Ip, PTI 3702, 3/F, HKPC Building, 78 Tat Chee Avenue, Kowloon Tong

**All cheques should be crossed and made payable to "Hong Kong Productivity Council".*

ENQUIRY

Hong Kong Productivity Council

Miss Holly Ip

Tel: 2788 6366　　Email: hollyip@hkpc.org

Miss Yeung

Tel: 2788 5833　　Email: mcy@hkpc.org

Website: www.hktrainingonline.com

Lexiwave Technology (Hong Kong) Ltd.

Mr. Henry Lau

Tel: 2144 2592　　Email: henry.lau@lexiwave.com

Hong Kong Productivity Council
香港生產力促進局

PRODUCTIVITY 生產力培訓學院 Training Institute

報名表 Enrolment Form

請以正楷填寫此表格　Please complete this form in BLOCK LETTERS.

課程 Programme：

課程編號 Programme Code：	課程名稱 Programme Title：	學費 Programme Fee:

甲部 (Part A) 申請者資料 Applicant Information：

中文姓名 (先生/小姐/太太/女士*)： Chinese Name (Mr./Miss/Mrs./Ms*)：				
英文姓名： Name in English：	姓 last name		名 first name	(必須與香港身份證/護照相同 Must be the same as shown on ID card/Passport)
公司名稱： Company Name：				
職位： Position：				

最高教育程度 Highest Achieved Education Level (請選擇一項。 Please select one only.)：

☐ 小學 Primary School　☐ 中學 Secondary School　☐ 文憑至副學位 Diploma to Associate Degree　☐ 學位 Degree　☐ 研究院或以上 Postgraduate

辦事處電話： Office Telephone：		手提電話： Mobile No.：		住宅電話： Home Telephone：	
電郵地址： E-mail Address：				傳真： Fax：	
通訊地址： Correspondence Address：					

乙部(Part B) 繳費方法 Method of Payment：

請選擇一項 Please select one only

☐ 現金 Cash

☐ 支票號碼 Cheque No.：_____，(公司 Company / 私人 Private*)。
(支票請劃線，抬頭人為「香港生產力促進局」。The cheque has to be crossed and made payable to the "Hong Kong Productivity Council.")

Is The programme fee sponsored by your employer?
課程費用由僱主贊助？　☐ YES 是　☐ NO 否

*Please delete whichever inappropriate / 請刪去不適用者

聲明 Declaration：

本人聲明在此報名表格及隨附文件所載的資料，依本人所知均屬完整真確。
I declare that all information provided in this enrolment form and the attached documents are, to the best of my knowledge, accurate and complete.

本人同意如本人獲取錄入學，本人當遵守學院的規則。
I consent that if admitted, I will comply with all the Rules and Regulations stipulated by the Institute.

本人已細閱報名表的重要通知，並明白所有〝重要通知〞內容均以本院課程單張及網頁之最後更新版本為依歸。
I have read and understood the "Important Note" in this enrolment form is subject to revisions in the course pamphlets and the latest updates in the Institute's website.

申請者簽名
Applicant's Signature： _____

日期
Date： _____

報名程序

請填妥報名表、連同相關課程需要的文件及費用，親身或以郵遞方式遞交。

郵寄地址：九龍達之路 78 號生產力大樓香港生產力促進局生產力培訓學院 (請於信封面註明報讀課程名稱及編號。)

重要通知:

1. 報名表(可用影印本)必須連同學費於開課前一併繳交，否則報名無效。
2. 本局已實施個人資料(私隱)政策，有關資料單張可於報名處索閱，或閣下可與本局個人資料管理主任查詢。
3. 本局建議申請者以信用咭、易辦事或支票繳交學費。學費收據以本局機印方為有效，支票收妥作實。
4. 除非本局於課程開始前最少 5 個工作日收到申請者書面通知退學，否則已繳學費概不退還。申請者申請退還學費需繳交手續費二百元正。
5. 申請者可提名他人代替其本人出席課程，惟事先須得本局同意。
6. 香港生產力促進局保留在任何情況下及以任何原因拒絕任何人學申請的權利。申請者繳付學費後，仍須符合入學的所有條件，其申請方可獲得接納。
7. 香港生產力促進局保留在任何情況下更改課程內容、授課地點、日期及時間的權利。
8. 颱風及黑雨警告：如課堂時間是在早上(09:00-13:00)、下午(14:00-17:00)或晚間(6:30-10:00)，將在下列情況下取消：(一)八號或以上颱風訊號或黑色暴雨警告訊號在早上 6:00、11:00 或下午 4:00 仍然懸掛；或(二)香港天文台在早上 6:00、11:00 或下午 4:00 或之後，宣佈將懸掛八號或以上颱風訊號或黑色暴雨警告訊號。本局將盡早通知學員補課的日期及時間。

Enrolment Procedure：

Please complete and send the enrolment form with required documents and fee to the Institute in person / by mail.

Mailing Address: Productivity Training Institute, Hong Kong Productivity Council, HKPC Building, 78 Tat Chee Avenue, Kowloon. (Please mark the programme title and programme code on the envelope.)

IMPORTANT NOTE:

1. Course fee must be accompanied with this form (or photocopy) before course commence, otherwise enrolment would be rejected.
2. HKPC has adopted a Personal Data (Privacy) Policy. Information about the policy is available at HKPC enrolment counters for collection. You may also contact our Personal Data Controlling Officer for further details.
3. Applicants are encouraged to pay by credit cards, EPS or cheques, if possible. Amount received will be imprinted. Cheques are subject to bank clearance.
4. Enrolment fee is not refundable unless HKPC is notified in writing of your withdrawal **at least** 5 working days before the course commences. A handling charge of HK$200 will also be levied.
5. An applicant may, subject to approval from HKPC, nominate a person to attend the course on his/her behalf.
6. HKPC reserves the right to reject any application in any circumstances and for whatever reasons. Payment of fees should only be construed as conditional acceptance of application.
7. HKPC reserves the right to change the contents, venue and / or time as necessary.
8. Classes in the morning, afternoon or evening will be cancelled if typhoon signal No. 8 or above OR black rainstorm warning is still hoisted after (or is announced by the Hong Kong Observatory to be hoisted at/after) 6:00 a.m., 11:00 a.m. and 4:00 p.m. respectively. Participants will be notified when the class will be made up as soon as possible.