Coupling-Matrix Design of Advanced RF/Microwave Filters

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Overview

This short course introduces students to the science and art of advanced RF/microwave filter design. Students taking this course should be familiar with fundamental RF concepts such as impedance matching, transmission line theory and scattering parameters. Previous exposure to filter design is helpful but not required. The course starts by introducing students to the importance of RF filters in modern reconfigurable communication systems followed by the fundamentals of filter design. It subsequently introduces students to the coupling-matrix design theory followed by many practical synthesis examples. Without sacrificing mathematical rigor, the course emphasizes the practical step-by-step design process. Relevant matlab scripts will be provided to students so they can perform their own designs. Students will be able to design complex transfer-function filters that go beyond traditional textbook-style filters. In addition, planar and three dimensional practical filter examples will be presented. The course will conclude by providing examples of the most successful reconfigurable filter architectures that exploit the aforementioned techniques. Students completing this course will be able to understand basic and advanced filter concepts as well as comprehend state-of-the-art tunable designs published in the technical literature.

Dates for the Course	**11th December, 2017 to 16th December, 2017**
Host Institute	**IIT Madras**
No. of Credits	**1**
Maximum No. of Participants	**40**
You Should Attend If…	▪ You are a student (BTech/MSc/MTech/PhD) or faculty from a reputed academic/technical institution interested in design of advanced RF/Microwave filters ▪ You are an engineer/researcher from manufacturing, service or government organization including R&D laboratory interested in design of advanced RF/Microwave filters
Course Registration Fees	The participation fees for taking the course is as follows: **Student Participants:** Rs.1000, **Faculty Participants:** Rs.5000 **Government Research Organization Participants**: Rs.5000, **Industry Participants:** Rs.10000 **Modes of payment:** Online transfer: Account Name: CCE IIT Madras Acc. No.: **36401111110** Branch: SBI, IIT Madras Branch, Chennai , IFSC Code: SBIN0001055 OR Demand draft in favour of **"Registrar, IIT Madras"** payable at **Chennai**. The demand draft is to be sent to the Course Coordinator at the address given below. The above fee is towards participation in the course, the course material, computer use for tutorials and assignments, and laboratory equipment usage charges.
Accommodation	The participants may be provided with hostel accommodation, depending on availability, on payment basis. Request for hostel accommodation may be submitted through the link: http://hosteldine.iitm.ac.in/iitmhostel/

Course Faculty

Dimitrios Peroulis (IEEE Fellow, 2017) is currently focused on the areas of microwave and millimeter-wave integrated circuits and antennas, RF MEMS (switches, varactors, inductors), novel architectures for multifunctional RF front-ends including tunable filters, antennas, matching networks and power amplifiers, high frequency 3D interconnects, NEMS resonators, RF/Bio sensors. He has been a key contributor on a wide variety of government and industry projects for developing very high quality RF MEMS tunable filters in the 1-100 GHz range in mobile form factors. Furthermore, he has been investigating failure modes of RF MEMS and MEMS sensors through the DARPA M/NEMS S&T Fundamentals Program, Phases I and II) and the Center for the Prediction of Reliability, Integrity and Survivability of Microsystems (PRISM) funded by the National Nuclear Security Administration. He received the National Science Foundation CAREER award in 2008. He has co-authored over 300 journal and conference papers. In 2014 he received the Outstanding Young Engineer Award of the IEEE Microwave Theory and Techniques Society (MTT-S). In 2012 he received the Outstanding Paper Award from the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society (Ferroelectrics section). His students have received numerous student paper awards and other student research-based scholarships. He is a Purdue University Faculty Scholar and has also received ten teaching awards including the 2010 HKN C. Holmes MacDonald Outstanding Teaching Award and the 2010 Charles B. Murphy award, which is Purdue University's highest undergraduate teaching honor.

Course Coordinator

Dr.Amitava DasGupta has been a Faculty member in the Department of Electrical Engineering, I.I.T. Madras since 1993 and is currently a Professor. His research interests are in the areas of Semiconductor Device Modeling and Technology and as well as MEMS, particularly RF MEMS. He has supervised more than 25 research scholars for their M.S. (by research) / Ph.D degrees. He has more than 160 research publications in International Journals and Proceedings of International Conferences and has co-authored a book on Semiconductor Devices – Modeling & Technology. He is an Editor of the IETE Technical Review and ISSS Journal of Micro and Smart Systems. He is a Fellow of Indian National Academy of Engineering (INAE).

Course Coordinator

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