

EE1001: Electrical and Magnetic Circuits

Introduction

12th January 2015

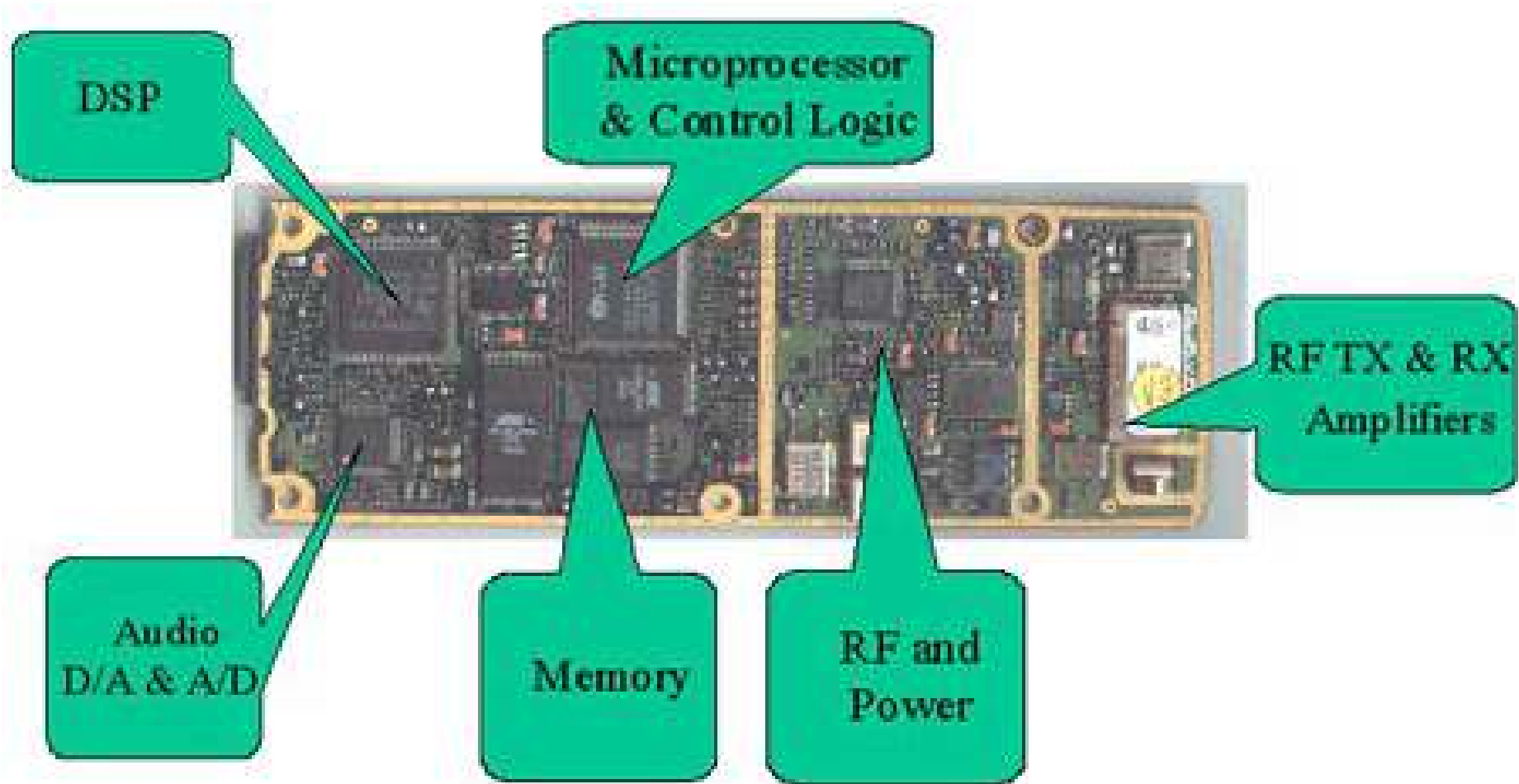
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http://www.ee.iitm.ac.in/vlsi/courses/ee1001_2015/start

What are E & M Circuits?

- Electrical Circuits:
 - Interconnection of Electrical Components
 - All electronic and electrical gadgetry
- Magnetic Circuits:
 - Interconnection of Magnetic Components
 - Generators, Motors, Transformers
- Absolutely **everywhere** around us!

Mobiles, Laptops, Music players, ...



[<http://static.ddmcdn.com/gif/cell-phone-inside.jpg>]

Mobiles, Laptops, Music players, ...



[<http://smartech.blogetery.com/files/2008/04/asus-eee-pc-900-inside.jpg>]

Transformers, Generators, ...



[http://i01.i.aliimg.com/photo/v0/110482299/Power_Transformer.jpg]

[<http://media.digikey.com/Renders/Johanson%20Tech%20Renders/2.45GHz%20Balun6.jpg>]

What is EE1001 all about?

- Analysis techniques applicable to **all circuits**
- Not about any particular circuit
- One of the two most important EE courses (the other being Networks and Systems)
- Pre-requisite for:
 - Networks and Systems
 - Electrical Machines
 - Analog Circuits
 - Placements in core EE companies!

Course topics

- Electrical quantities and elements
- Electrical circuit analysis; Theorems
- One and two port networks; Transformations
- Negative feedback and ideal opamp
- RL, RC, RLC circuits
 - Solving differential equations
 - Forced and natural response
 - Sinusoidal steady state; Phasors
- Polyphase circuits
- Magnetic circuits

Course goals

- Learn circuit analysis and learn it well!
 - Practice, practice, and practice problem solving
 - Understand every step of problem solving
- Learn about linearity and its implications
- Learn rudiments of nonlinear circuit analysis

Logistics

- Timetable
 - A1 slot (nominal)
 - Mo 8am, Tu 1pm, Th 11am, Fr 8am
 - Classroom: CRC101
- Evaluation
 - 4 quizzes (total of 50-60%; Feb. 2, Feb. 23, Mar. 23, Apr 13)
 - End sem (40%)
 - Problem sets (up to 10%)

Tutorials

- ~ 10 tutorials over the semester
- Problem sets will be posted in advance
- Must solve problems before the tutorial session and bring the solution to class
- Use tutorial sessions for clarifications and understanding difficult concepts

Classroom etiquette and expectations

- Mobile phones off
- 85% attendance
- Don't enter the class if more than 5 minutes late
- TAs take attendance in the first 5 minutes
- Don't sit in the back rows
- **Must solve problems** given in class
 - Bring your pen, notebook, calculator and **use them**
- **Participate** in classroom Q&A

Classroom participation

- Get your doubts cleared
- Improve your understanding
- Develop (technical) communication skills
 - Poor communication skills-a constant complaint from prospective employers

“Learning” or “Knowing” something

- What does it mean?

“Learning” or “Knowing” something

- Make quantitative predictions about similar or slightly different situations
- Practice solving a variety of problems...
- ...while understanding every step
- Will not happen without your active participation both inside and outside the classroom

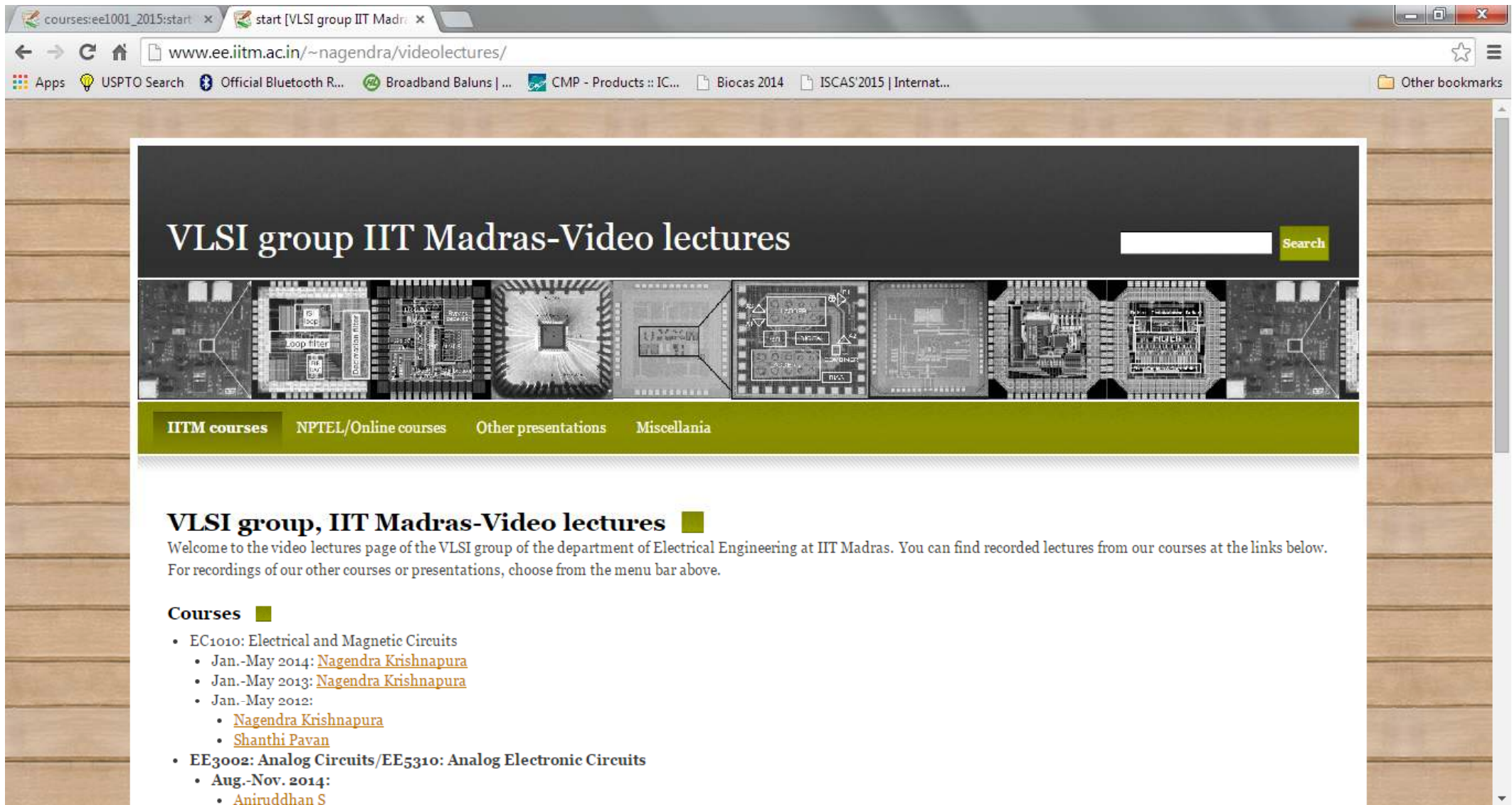
Some inspiration

- <http://teachingexcellence.mit.edu/inspiring-teachers/amar-bose-6-312-lecture-01-introduction>
- <http://teachingexcellence.mit.edu/inspiring-teachers/amar-bose-6-312-lecture-27-personal-reflections>

Resources

- Class homepage
 - EE1001 page on moodle-Use the forum!
 - http://www.ee.iitm.ac.in/vlsi/courses/ee1001_2015/start
- Lectures recorded in the classroom:
 - <http://www.ee.iitm.ac.in/nagendra/videolectures/>
- Textbook
 - Hayt, Kemmerly, and Durbin, Engineering Circuit Analysis, 7th Edition, McGraw Hill 2006.
- Extras: NPTEL(<http://nptel.iitm.ac.in>)
 - SC Dutta Roy, Circuit Theory,
<http://nptel.iitm.ac.in/video.php?subjectId=108102042>

Videlectures page



The screenshot shows a web browser window with the URL www.ee.iitm.ac.in/~nagendra/videlectures/. The page has a dark header with the text "VLSI group IIT Madras-Video lectures" and a search bar. Below the header is a horizontal strip of images showing various VLSI components and circuit diagrams. A green navigation bar contains the following links: "IITM courses", "NPTEL/Online courses", "Other presentations", and "Miscellania".

VLSI group, IIT Madras-Video lectures ■

Welcome to the video lectures page of the VLSI group of the department of Electrical Engineering at IIT Madras. You can find recorded lectures from our courses at the links below. For recordings of our other courses or presentations, choose from the menu bar above.

Courses ■

- EC1010: Electrical and Magnetic Circuits
 - Jan.-May 2014: [Nagendra Krishnapura](#)
 - Jan.-May 2013: [Nagendra Krishnapura](#)
 - Jan.-May 2012:
 - [Nagendra Krishnapura](#)
 - [Shanthi Pavan](#)
- EE3002: Analog Circuits/EE5310: Analog Electronic Circuits
 - Aug.-Nov. 2014:
 - [Aniruddhan S](#)

- <http://www.ee.iitm.ac.in/~nagendra/videlectures/>

Course page on VLSI group site

teaching:start [VLSI group] x start [VLSI group IIT Madras] x

www.ee.iitm.ac.in/vlsi/teaching/start

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VLSI group, IIT Madras

Search

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Teaching

Our graduate and undergraduate courses are handled by faculty actively engaged in research. The core courses and electives are designed to give students a firm grounding in basics and advanced skills in the chosen area of specialization.

NPTEL courses

The following courses by our faculty are on NPTEL

- [Analog IC Design](#): Nagendra Krishnapura
- [VLSI Data Conversion Circuits](#): Shanthi Pavan

Recorded lectures

We now record our lectures in class. They are available at [this site](#) and through links from each course page.

- <http://www.ee.iitm.ac.in/vlsi/teaching/start>

Course page on Moodle

teaching:start [VLSI group] x start [VLSI group IIT Madri] x EE1001:JAN-MAY 2015: Pa x

https://courses.iitm.ac.in/user/index.php?id=1527

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You are logged in as ANIRUDDHAN S (EE) (Log out)

EE1001 : Electrical and Magnetic Circuits

Home ▶ My courses ▶ JAN-MAY-2015 ▶ EE-JAN-MAY-2015 ▶ EE1001:JAN-MAY 2015 ▶ Participants

Navigation My courses EE1001:JAN-MAY 2015 User list Brief

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Current role: All participants

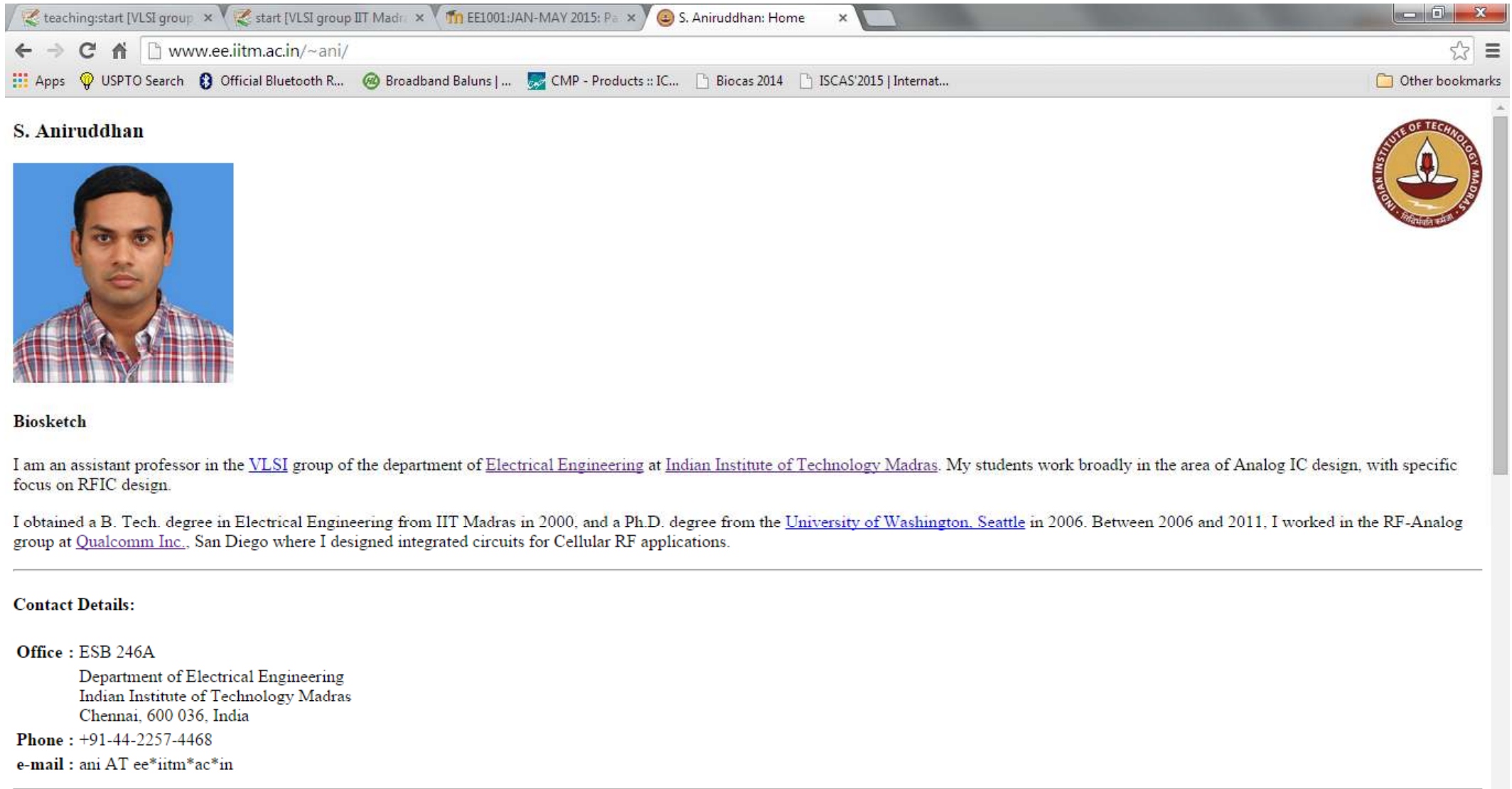
All participants: 118 *

First name : AllABCDEFGHIJKLMNOPQRSTUVWXYZ
Surname : AllABCDEFGHIJKLMNOPQRSTUVWXYZ
Page: 1 2 3 4 5 6 (Next)

Select	User picture	First name / Surname	Email address	Department	City/town	Country	Last access
<input type="checkbox"/>		ANIRUDDHAN S (EE)	ani@iitm.ac.in		Chennai	India	30 secs
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<input type="checkbox"/>		EE13B039 LOPAMUDRA BALIARSINGH	ee13b039@smail.iitm.ac.in	EE	Chennai	India	10 hours 54 mins
<input type="checkbox"/>		EE14B057 SREE SUBIKSHA M R	ee14b057@smail.iitm.ac.in	EE	Chennai	India	1 day 3 hours

- <https://courses.iitm.ac.in/>

My homepage



The screenshot shows a web browser window with the following details:

- Browser Tabs:** teaching:start [VLSI group], start [VLSI group IIT Madras], EE1001:JAN-MAY 2015: Pa..., S. Aniruddhan: Home
- Address Bar:** www.ee.iitm.ac.in/~ani/
- Bookmarks:** Apps, USPTO Search, Official Bluetooth R..., Broadband Baluns | ..., CMP - Products :: IC..., Biocas 2014, ISCAS'2015 | Internat..., Other bookmarks
- Page Content:**
 - S. Aniruddhan**
 - 
 - Biosketch**
 - I am an assistant professor in the [VLSI](#) group of the department of [Electrical Engineering](#) at [Indian Institute of Technology Madras](#). My students work broadly in the area of Analog IC design, with specific focus on RFIC design.
 - I obtained a B. Tech. degree in Electrical Engineering from IIT Madras in 2000, and a Ph.D. degree from the [University of Washington, Seattle](#) in 2006. Between 2006 and 2011, I worked in the RF-Analog group at [Qualcomm Inc.](#), San Diego where I designed integrated circuits for Cellular RF applications.
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