



# NEW HORIZON COLLEGE OF ENGINEERING

AUTONOMOUS COLLEGE Permanently Affiliated to VTU. Approved by AICTE & UGC  
Accredited by NAAC with 'A' Grade

Department of Electronics and Communication Engineering

13.04.2018

## EXPERT LECTURE

The ECE students are hereby informed that **Expert Lecture** is scheduled on

**“FPGA Implementation”**

on **16.04.2018.**

By

**Mr Shashikanth Patil**

Senior Project Engineer, Wipro Technologies Ltd, Bangalore

Timing schedule is as follows

Sl. No	Timings	Semester
1	9:30AM-11:30AM	4 <sup>th</sup> ( A , B & C)

Respective subject teachers are hereby informed to be present in the Seminar Hall during the schedule.

Note: All Faculty members are invited to attend the same (without affecting regular classes)

Venue: Falconary Seminar Hall

*Careshil*

Expert Lecture Faculty In-charge

*Shashikanth Patil*

HoD-ECE

**Shashikanth Patil**#634, 2<sup>nd</sup> Floor, 7<sup>th</sup> Mainroad, Vijayanagar, Bengaluru – 560040Email ID: [shashi.vnit@gmail.com](mailto:shashi.vnit@gmail.com); Contact: +91-9880962096**Career Objective:**

To work in an innovative, challenging environment & help organization to achieve its objective in the most efficient manner by applying my skills, abilities and thereby growing with the organization.

**Profile Summary:**

- 7.5+ years of experience in FPGA/ASIC – Design, RTL Simulation, Synthesis, Creating testbench environment & Verification. Additional 2.2+ years of experience in Training & Academics.
- Experience in IP/Block Level Verification with Constraint Random, Assertions & Functional Coverage; creating verification environment with SystemVerilog, Verilog/VHDL & UVM/OVM.
- Experience with EDA Tools such as Synopsys – VCSMX, Verdi/ DVE; QuestaSim v10.1c, Xilinx ISE v12.1 and FPGA – Spartan 3E, Virtex 5; Programming & Scripting with MATLAB, C & Perl.
- Working knowledge on Peripheral Interface & OnChip Protocols – AMBA AXI/AHB, OCP, SPI, UART & USB 3.x, and complete Wind-Profiler Radar Sub-Systems.
- Work experience on Lab Equipments/Diagnostic tools such as Signal Generator, Oscilloscope, Spectrum Analyzer and Network Analyzer.

**Professional Experience:**

- |  |   |
|--|---|
| ▪ <b>WIPRO Technologies Ltd., Bengaluru</b><br>Designation: <i>Senior Project Engineer</i>               | <b>Duration:</b> Jan 2015 to till date  |
| ▪ <b>Spanwave Technology Solutions Pvt. Ltd., Bengaluru</b><br>Designation: <i>Senior Engineer</i>       | <b>Duration:</b> July 2010 to Dec 2014  |
| ▪ <b>New Horizon College of Engineering., Bengaluru</b><br>Designation: <i>Teaching Staff (Lecturer)</i> | <b>Duration:</b> Feb 2009 to May 2010   |
| ▪ <b>C2C Semiconductors Pvt. Ltd., Bengaluru</b><br>Designation: <i>Member Technical Staff</i>           | <b>Duration:</b> April 2008 to Jan 2009 |

**Education Qualification:**

- **M.Tech (Embedded Electronic Systems)** from Visvesvaraya National Institute of Technology (NIT/REC), Nagpur (Maharashtra, INDIA) during 2005 – 07.
- **B.E. (Electronics & Communication Engineering)** from Visvesvaraya Technological University, Belgaum (Karnataka, INDIA) during 2001 – 05.

**Achievement :** Qualified GATE – 2005 with 97.5 percentile (All India Rank – 915)

I hereby declare that the above particulars are true and correct to the best of my knowledge.

**SHASHIKANTH PATIL**

Expert Lecture ( System Design using HDL)

NEW HORIZON COLLEGE OF ENGINEERING  
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING  
IV Sem "A" Sec

SL.No	USN	NAME	
1	1NH15EC015	DEBBRAT MAHAPATRA	<del>Debb</del>
2	1NH16EC001	A M AMARJITH	Debb
3	1NH16EC002	ABHISHEK KUMAR DESHETTI	Abhishek
4	1NH16EC003	ADITYA C	Aditya
5	1NH16EC004	AFZAL HUSSAIN	Afzal
6	1NH16EC005	AKHIL JOSEF	Akhil
7	1NH16EC006	AKHILESH VARMA KALIDINDI	Akhil
8	1NH16EC007	AKSHAY RAO	Akshay
9	1NH16EC008	ANMOL KUMAR	Anmol
10	1NH16EC009	ANOOP.A	Anoop
11	1NH16EC010	ANUSHA H N	Anusha
12	1NH16EC011	ARUN.P	Arun
13	1NH16EC012	ATHIRA AJAYA KUMAR KULLULLY	Athira
14	1NH16EC013	YUGANDHAR REDDY	Yugandhar
15	1NH16EC014	B SRIKANTH REDDY	B Srikanth
16	1NH16EC015	BHASKAR CHOUDHURY	Bhaskar
17	1NH16EC016	BIPIN DIXIT.H	Bipin
18	1NH16EC017	KIRAN C A	Kiran C. A
19	1NH16EC018	ARUNA C	Aruna
20	1NH16EC019	C.LEHARIKA	C. Leharika
21	1NH16EC020	CETHAN S	Cethan
22	1NH16EC022	DARSHAN RAJ	Darshan
23	1NH16EC023	DEEPAK KU. PRADHAN	Deepak
24	1NH16EC024	DEEPTHI R	Deepthi
25	1NH16EC025	DENNIS VINCENT PAULRAJ	Dennis
26	1NH16EC026	DUDEKUL AKHASIM	Dudekul
27	1NH16EC027	ELDHO JOSE	Eldho
28	1NH16EC028	ELLINKI JAHNAVI	Ellinki
29	1NH16EC029	VICTOR ABHILASH	Victor
30	1NH16EC030	G AVINASH	G Avinash
31	1NH16EC031	GIRISH JATTU GOUDA	Girish
32	1NH16EC032	HARI PRASAD.R	Hari Prasad
33	1NH16EC033	HARSH SRIVASTAVA	Harsh
34	1NH16EC034	JAGADEESH.D	Jagadeesh
35	1NH16EC035	JANANI.B.R	Janani
36	1NH16EC036	GIRIVARDHAN K	Girivardhan
37	1NH16EC037	KALAMADI SREELEKHA	Kalamadi
38	1NH16EC039	KIRAN N	Kiran
39	1NH16EC040	KISHORE N	Kishore
40	1NH16EC041	K. VENKATA MOUNISH REDDY	K. Venkata
41	1NH16EC042	KORVI CHANDRA KIRAN REDDY	Korvi

42	1NH16EC043	KUSHI PONNAMMA.K.P	<del>Kushi</del>
43	1NH16EC044	LALITHAMBHA S M	Lalithambha.S.M.
44	1NH16EC046	SACHIT M	Sachit M
45	1NH16EC047	MADAN GOWDA.M	Madhan
46	1NH16EC048	MADHU M DEVAMANE	Madhu
47	1NH16EC049	MANJULA.S	Manjula.S
48	1NH16EC050	MANJUNATH N	Manjunath
49	1NH16EC051	MANJUNATHA S	Manjunath
50	1NH16EC052	MAURYA REDDY	Maurya
51	1NH16EC053	MEGHASHREE H M	Meghashree.H.M.
52	1NH16EC054	MEGHANA V	
53	1NH16EC055	MEGHASHREE R	Meghashree.R
54	1NH16EC056	MISBAH TABASSUM AEJAZ	
55	1NH16EC057	MITHUN.V	
56	1NH16EC058	MOHAMMED ANAS	Mohammed Anas
57	1NH16EC059	MOHAMMED FAROOQH PASHA	Mohammed Farooqh Pasha
58	1NH16EC060	MOHIT R	Mohit R
59	1NH16EC061	MOHIT SAHU	Mohit Sahu
60	1NH16EC062	MUJEER PASHA	Mujeer Pasha
61	1NH16EC063	MAHESHWARI N	Maheshwari N
62	1NH16EC134	T. HEMANTH KRISHNA	T. Hemant Krishna
63	1NH16EC135	AKULA ANIL BHARATH	Akula Anil Bharath
64	1NH16EC136	ALVIRA SUZANA	Alvira Suzana
65	1NH16EC137	ANUPOJU SAI VENKAT THRIMURTHY	Anupaju Sai Venkat Thrimurthy
66	1NH16EC138	ASHISH KUMAR . S	Ashish Kumar . S
67	1NH16EC139	KARTHIK . K . S	Karthik . K . S
68	1NH17EC428	SUMAN . K . T	Suman . K . T
69	1NH17EC400	AKASH PRASAD C	Akash Prasad C
70	1NH17EC402	ARATHI . V	Arathi . V
71	1NH17EC403	BHAVANI . V	Bhavani . V
72	1NH17EC412	KIRAN . R	Kiran R
73	1NH17EC419	PRASANNA KUMAR . A . E	Prasanna Kumar . A . E
74	1NH17EC423	RAJESHA . T . A	Rajesh . T . A
75	1NH17EC429	SUPRITHA H . D	Supriya H . D

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**NEW HORIZON COLLEGE OF ENGINEERING**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**  
**IV Sem "B" Sec**

SL.No	USN	NAME	
1	INH16EC064	NEHA MAHESH	
2	INH16EC066	NISHU DUBEY	<u>Neha</u>
3	INH16EC067	NITESH K	<u>Nishu</u>
4	INH16EC068	NITHIN.E	<u>Nitesh K</u>
5	INH16EC070	MAHALAKSHMI P	<u>Nithin</u>
6	INH16EC071	DEEPAK P S	<u>P. Mahalakshmi</u>
7	INH16EC072	PARITHOSH VEMA	<u>Deepak P.S</u>
8	INH16EC074	PAVAN KUMAR S	<u>Parithosh Vema</u>
9	INH16EC075	POOJA SHANTARAM NAYAK	<u>Pavan K.S</u>
10	INH16EC076	PRAJWAL.T.J	<u>Pooja</u>
11	INH16EC077	PRANAY REDDY S	<u>Prajwal</u>
12	INH16EC078	PRASHANTH GOWDA.R.S	<u>Pranay Reddy S</u>
13	INH16EC079	PRAVEEN KUMAR S	<u>Prashanth R.S</u>
14	INH16EC080	PRESHIKA J M	<u>Praveen K.S</u>
15	INH16EC081	PRITHIPA A	<u>Preshika J.M</u>
16	INH16EC082	R.PAVAN RAJ	<u>Prithipa A</u>
17	INH16EC083	RAJVARDHAN	<u>R.Pavan Raj</u>
18	INH16EC084	RAKSHITHA N	<u>Rajvardhan</u>
19	INH16EC085	ROSHINI.M	<u>Rakshitha N</u>
20	INH16EC086	RUSHAB.S.G	<u>Roshini.M</u>
21	INH16EC087	SAI KIRAN	<u>Rushab.S.G</u>
22	INH16EC088	SAI PRASHANTH	<u>Sai Kiran</u>
23	INH16EC089	S P SAAJU	<u>Sai Prashanth</u>
24	INH16EC090	SAGAR	<u>S.P. SAAJU</u>
25	INH16EC091	SAM LEANDER D	<u>Sagar</u>
26	INH16EC092	SANNAPANENI PAVANI	<u>Sam Leander D</u>
27	INH16EC093	SHAIK NOORULLA BASHA	<u>Sannapaneni Pavani</u>
28	INH16EC094	SHAIKH ASIF	<u>ShaiK Noorulla Basha</u>
29	INH16EC095	SHASHANK B	<u>ShaiK Asif</u>
30	INH16EC096	SHRAVIN.R.SEKHAR	<u>Shashank B</u>
31	INH16EC097	SHRIPAD AITHAL	<u>ShraVin.R.Sekhar</u>
32	INH16EC098	SIDDESH JALAGERI	<u>Shripad Aithal</u>
33	INH16EC099	JAGAN MOHAN REDDY	<u>Siddesh Jalageri</u>
34	INH16EC100	SIDRAMAPPA	<u>Jagan Mohan Reddy</u>
35	INH16EC101	SINDHU C R	<u>Sidramappa</u>
36	INH16EC102	SIVA CHALLA	<u>Sindhu C.R</u>
37	INH16EC103	SPOORTHY.G	<u>Siva Challa</u>
38	INH16EC105	SUSHMA CHIKKUR	<u>Spoorthy.G</u>
39	INH16EC106	T.E.HABISHEK	<u>Sushma Chikkur</u>
40	INH16EC107	T.SAI DEEPTHI	<u>T.E. Habishek</u>
41	INH16EC108	TANUJ.A	<u>T.Sai Deepthi</u>

42	1NH16EC109	UDIT BAHUGUNA	
43	1NH16EC110	VARUN MISHRA	Varun
44	1NH16EC111	VEDA MILIND KULKARINI	Veda
45	1NH16EC112	VEENA K	Veena
46	1NH16EC113	VIDYA VISHNU	
47	1NH16EC114	VIJAY C	Vijay C
48	1NH16EC115	VIJAY KUMAR C	Vijay C
49	1NH16EC116	VIJAY S	Vijay S
50	1NH16EC118	VISHWANATH VEERANNA	Vishwanath
51	1NH16EC119	W M MAGDOOM FUAAD	W M Magdoom
52	1NH16EC120	YATHIN S	Yathin S
53	1NH16EC121	YATHISH K	Yathish K
54	1NH16EC122	YESHWANTH J M	Yeshwanth J M
55	1NH16EC124	YESHWANTH.M	Yeshwanth M
56	1NH16EC125	YESHWANTH.M.L	Yeshwanth M.L
57	1NH16EC128	SIMON CHAUHAN	Simon Chauhan
58	1NH16EC129	ASHOK CHOUDHARY	Ashok Choudhary
59	1NH16EC130	M.V.K BHARATH	M.V.K Bharath
60	1NH16EC131	NAMRATHA PRAKSAH	Namratha Praksah
61	1NH16EC132	PREM KUMAR	Prem Kumar
62	1NH16EC133	SRIDHAR. P	Sridhar P
63	1NH17EC401	AKSHAY GAMBHIR SADALAGI	Akshay Gambhir
64	1NH17EC406	DEEPAK KUMAR . R	Deepak Kumar R
65	1NH17EC407	GURURAJ SHIVASHANKAR NATIKAR	Gururaj Shivashankar
66	1NH17EC410	JYOTHI CHANDRASHEKAR	Jyothi Chandrashekar
67	1NH17EC414	LINGARAJ G. B	Lingaraj G. B
68	1NH17EC417	MONIKA T . M	Monika T. M
69	1NH17EC426	SACHIN . M	Sachin M
70	1NH17EC427	SHAMBULING V . PATIL	Shambuling V. Patil
71	1NH17EC430	SUSHMITHA	Sushmitha

**Note:** For highlighted students, attendance should not be called in any of the classes until the

**NEW HORIZON COLLEGE OF ENGINEERING**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**  
**IV Sem "C" Sec**

SL.No	USN	NAME	
1	1NH13EC730	MAMATHA V K	<u>Mamatha V K</u>
2	1NH14EC001	ABHIJITH S RAJ	
3	1NH14EC047	Harshavardhana A	
4	1NH14EC087	N. SHANTH KUMAR	
5	1NH14EC724	O. BHARGAVA REDDY	
6	1NH15EC007	A. VIKRAM KUMAR REDDY	
7	1NH15EC075	R RAGHAV SRIVATSAV	
8	1NH15EC109	SNEHIL BASU	<u>Snehil</u>
9	1NH15EC434	SUDHANYA S	
10	1NH15EC736	RISHAV PAUL	<u>Rishav</u>
11	1NH16EC702	ABHISHEK KHOT	<u>Abhishek</u>
12	1NH16EC703	ABHISHEK PATTAJOSHI	<u>Abhishek</u>
13	1NH16EC704	ABU BAKAR SIDDIQ	<u>Abu Bakar</u>
14	1NH16EC705	AKSHAY.V	<u>Akshay V</u>
15	1NH16EC706	AMMIDAL VISHNU VIKAS	<u>Ammidal</u>
16	1NH16EC707	ANITA CHAUHAN	<u>Anita Chauhan</u>
17	1NH16EC708	ANJU GOPINATH	<u>Anju</u>
18	1NH16EC709	ASHUTOSH MANISH	<u>Ashutosh M</u>
19	1NH16EC710	B VAMSHI KRISHNA REDDY	
20	1NH16EC711	BALAJI L	
21	1NH16EC712	CHETHAN.D.R	<u>Chethan D.R</u>
22	1NH16EC713	CHIRAG S	<u>Chirag S</u>
23	1NH16EC714	GAGANA M R	<u>Gagan M.R</u>
24	1NH16EC715	GOWRI SNEHA PRIYA S	<u>Gowri Sneha</u>
25	1NH16EC716	GURRAM VENKATA NIKESH	<u>Gurram Venkatesh</u>
26	1NH16EC717	HARSHITA.P	<u>Harshita</u>
27	1NH16EC718	JEEVAN.K	<u>Jeevan K</u>
28	1NH16EC719	MITHUN KUMAR	
29	1NH16EC720	KIRAN SAGAR N P	<u>Kiran Sagar</u>
30	1NH16EC722	LINGRAJ JAMKHANDI	<u>Lingraj</u>
31	1NH16EC723	M ANISHA	
32	1NH16EC724	M PRIYADARSHINI	<u>Priyadarshini</u>
33	1NH16EC725	MSVV RITVIK	<u>MSVV</u>
34	1NH16EC726	MANJUNATH T	<u>Manjunath</u>
35	1NH16EC727	MANSOOR ELAHI	<u>Mansoor</u>
36	1NH16EC728	MOHAMMED ZEESHAN ALI	<u>Zeeshan</u>
37	1NH16EC729	SIVA NAGAMUNI REDDY	<u>Siva M</u>
38	1NH16EC730	MOUNIKA E	<u>Mounika</u>
39	1NH16EC731	THILAK PRASAD	
40	1NH16EC733	NAWAZ KHAN	
41	1NH16EC734	NISHA ANANDU NAIK	<u>Nisha</u>
42	1NH16EC735	NIVEDITHA N	



43	INH16EC736	NIVEDITHA R	
44	INH16EC738	PAVITHRA.N	
45	INH16EC739	PAWAN KUMAR SRIVASTAVA	Pawan
46	INH16EC740	POOJA P CHOUHAN	
47	INH16EC741	PRAVEEN KUMAR R	P.R. Praveen R
48	INH16EC742	RACHANA.S	Rachana.S
49	INH16EC743	K RAGHAVENDRA	
50	INH16EC744	RAMYA.R	
51	INH16EC745	REDDY SHEKAR.B.S	Reddy Shekar
52	INH16EC746	RUCHIKA PRADEEP	
53	INH16EC747	S.SARAVANA	
54	INH16EC748	S SHYAM	Shyam
55	INH16EC749	SHRIYA.G	Shriya
56	INH16EC750	SINDHU A	Sindhu
57	INH16EC751	SMITHA B S	Smitha
58	INH16EC752	SWATHI K.	Swathi K.
59	INH16EC753	T.R. BHOOMIKA	
60	INH16EC754	TARUN SAI REDDY	Taru Sai Reddy
61	INH16EC755	ULTHI KEDARNATH	Kedarnath
62	INH16EC756	YESHASWINI K M	Yeshaswini
63	INH16EC757	YUVASHREE R	Yuvashree R.
64 (35)	INH16EC758	PRAVEEN.S	Praveen
65	INH16EC759	SHASHANK RAO.M	Shashank
66	INH17EC404	CHIRANJEEVI . K	Chiranjeevi K.
67	INH17EC405	B . N CHITHRASREE	Chithra
68	INH17EC408	JANARDHANA . T	Janardhana T.
69	INH17EC409	JAYANTH . V	Jayanth V.
70	INH17EC411	B . J KOWSALYA	B.J Kowsalya
71	INH17EC413	LIKITH B. M	Likith
72	INH17EC415	MANASA . C	Manasa C.
73	INH17EC416	MANOJ . R	Manoj R.
74	INH17EC418	NAVEEN KUMAR . J	Naveen R.
75	INH17EC420	PRATHAMESH KADAM	Prathamesh
76	INH17EC421	RAGHU . R	Raghu
77	INH17EC422	RAHUL JAIN	Rahul
78	INH17EC424	RAKESH KUMAR . T	Rakesh
79	INH17EC431	VASANTH . R	Vasanth

Note: For highlighted students, attendance should not be called in any of the classes





Sachin V &lt;sachuv91@gmail.com&gt;

**Regarding expert lecture**

3 messages

**Sachin V** <sachuv91@gmail.com>

To: shashi.vnit@gmail.com

Wed, Apr 11, 2018 at 5:37 PM

Cc: Aravinda Koithyar &lt;aravindake@gmail.com&gt;, karthikvishwanath1990 &lt;karthikvishwanath1990@gmail.com&gt;

Hi sir.

As discussed, we have scheduled the expert lecture for system design using HDL on Monday at 9:30. We require your official confirmation through mail and following details for initiating remuneration process.

Details required : Pan no , aadhar , date of birth, bank name account no, ifsc code and branch

Regards,  
Sachin V

**Shashikanth Patil** <shashi.vnit@gmail.com>

To: Sachin V &lt;sachuv91@gmail.com&gt;

Thu, Apr 12, 2018 at 5:45 PM

Cc: Aravinda Koithyar &lt;aravindake@gmail.com&gt;, karthikvishwanath1990 &lt;karthikvishwanath1990@gmail.com&gt;

Hi Sir,

Thank you for the opportunity, will be available for Guest Lecture on April 16, 2018 as per the schedule.

Pls find the required information below:

PAN Details : ~~XXXXXXXXXX~~

Date of Birth: April 05, 1984

**Bank Details:**

Bank Name: State Bank of India

A/C No. : ~~XXXXXXXXXX~~

IFSC Code : SBIN0003023

Branch : Rajaji Nagar 5th Block, Bengaluru

--  
Thanks & Regards,

Shashikanth Patil

[Quoted text hidden]

**Shashikanth Patil** <shashi.vnit@gmail.com>

To: Sachin V &lt;sachuv91@gmail.com&gt;

Tue, Apr 17, 2018 at 1:22 PM

Cc: Aravinda Koithyar &lt;aravindake@gmail.com&gt;, karthikvishwanath1990 &lt;karthikvishwanath1990@gmail.com&gt;

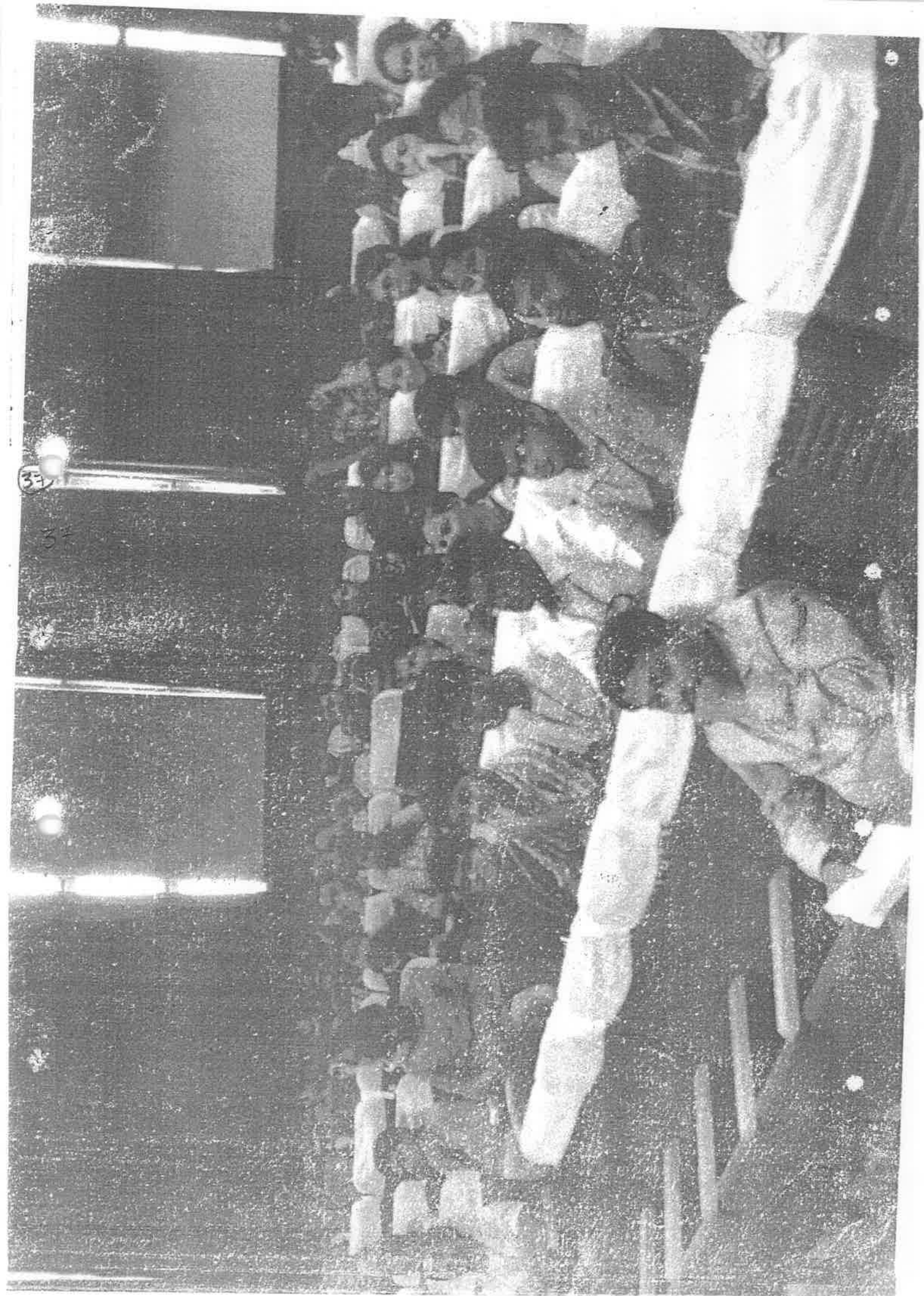
Hello Sir,

Pls find the attached Guest Lecture PPTs " VLSI- Digital System Design, Validation & Career Opportunities" .

--  
Thanks & Regards,

Shashikanth Patil

[Quoted text hidden]



## REPORT ON GUEST LECTURE

SHASHIKANT PATIL

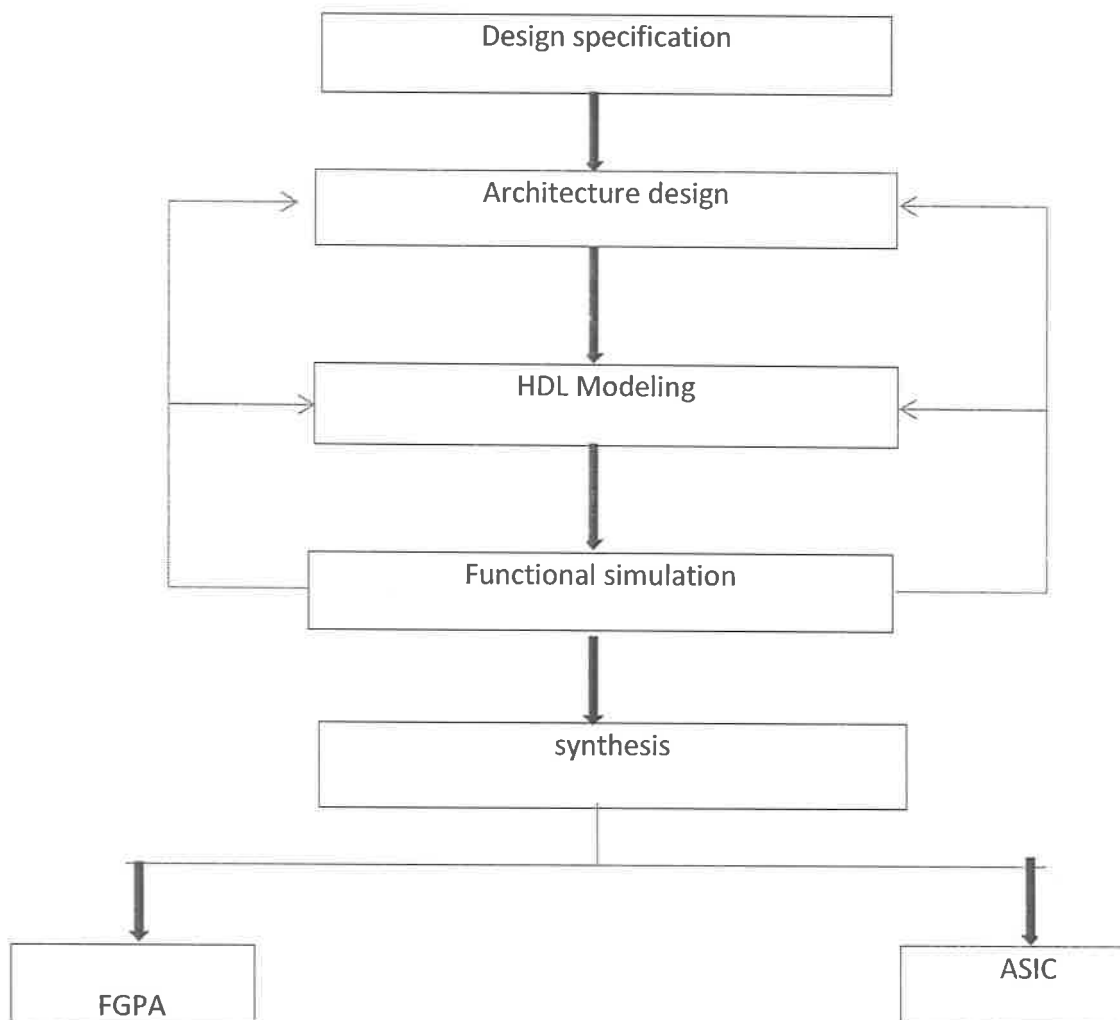
NAME:GURURAJ NATIKAR

USN:1NH17EC407 4<sup>th</sup> sem 'B' section

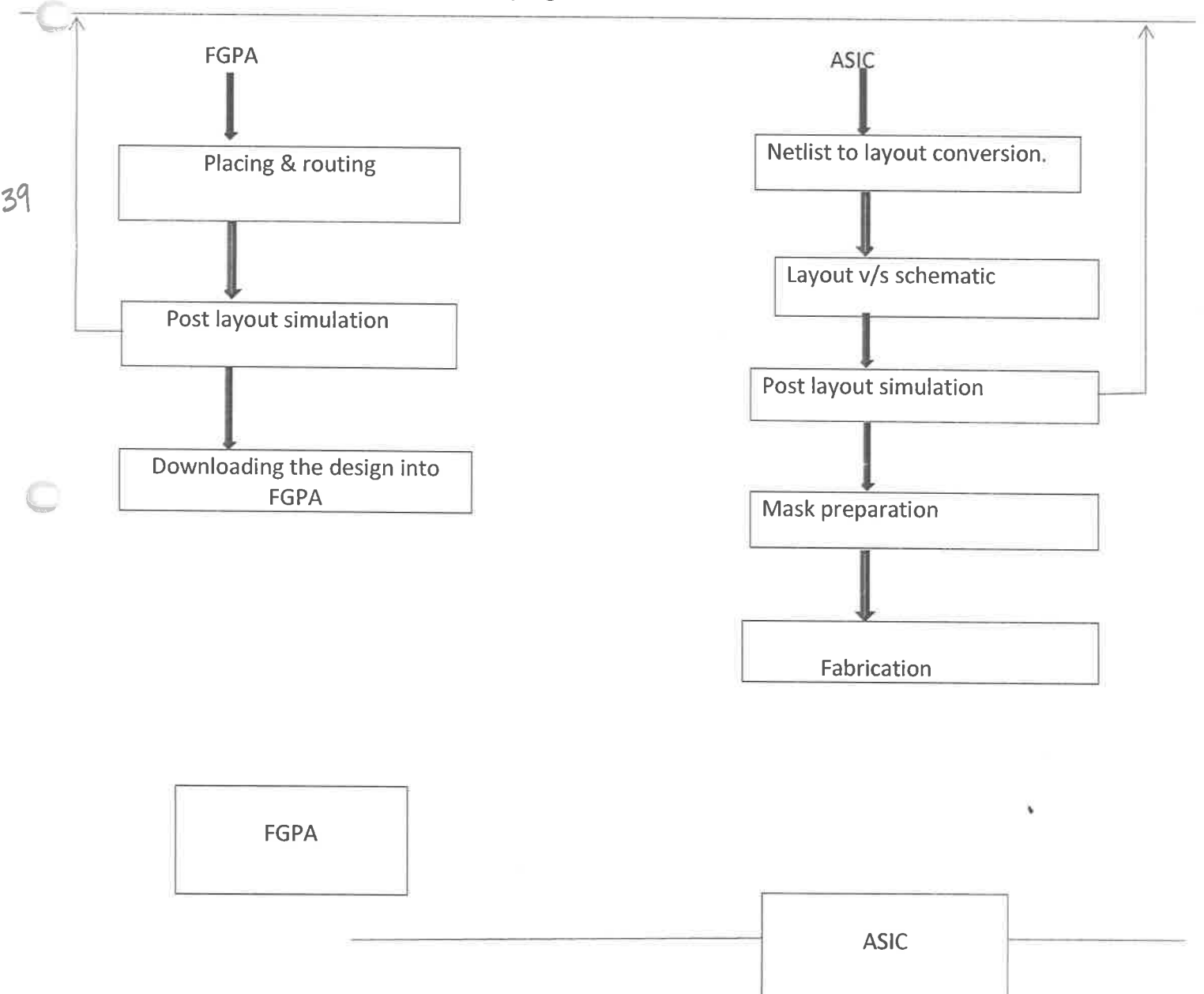
SUB:HDL

- Moore's prediction
- Intel is planning to launch 10nm.

### VLSI IC DESIGN FLOW



- Go & implement.
- Called state machine & finite state machine.
- These are all design specification.
- Example is traffic light controller.
- Architecture design is to implement the traffic light controller.
- Simulation is to simulate the program.
- Synthesis block it take to the input of the functional simulation.
- It generate the program.
- There are 2domains ie 1)FGPA 2)ASIC
- ASIC(Application specific integrated circuit).
- In FGPA dumping the code for program.



- These are in built steps.
- Mask preparation & fabrication is done by fabrication block.

#### ASIC s V/S FGPAs

- Depends on cost, total availability, performance & design flexibility.

#### Field programmable gate arrays(FGPAs)

- Faster time to market.
- No non recurring expenses(NRE).
- Simpler design cycle. field programmability & reusability.
- Good for prototyping & limited production.
- But
- Power consumption is more. (this is where as ASIC wins the race.)
- You have to use resources available in FGPA.
- Used for lower speed, lower complexity & lower volume designs.

#### Application for specific integrated circuits(ASICs)

- Cost...cost....lower unit cost.
- ASICs faster than FGPA.
- Low power consumption.
- You can implement analog/mixed signal design circuits which is not possible in FGPA.

#### Major market segments for FGPAs

- Digital signal processing.
- Embedded microcontroller.
- Aerospace, defense & space communication & technology.
- Physical layer communication.

#### FGPAs programming techniques

- Antifuse based devices.
- SRAM based devices.
- FLASH EPROM based devices.
- Hybrid FLASH-SRAM based devices.

### Overview on HDLs(VHDL/Verilog)

- HDL is a software programming language used to model the intended operation of a piece of hardware.
- The developments of VHDL begin in 1983 by US. Department of defence & in 1987 it was adopted as IEEE standard 1076.
- In 1983 gateway design automation released Verilog HDL.
- Two basic constructs of procedural assignments are initial & always block.

### Blocking & non-blocking assignments

blocking

ex: reg[1:0] reg\_a, reg\_b;

initial

begin

reg\_a = #10 2'b10;

reg\_b = #5 2'b01;

non-blocking

ex: reg[1:0] reg\_a, reg\_b;

initial

begin

reg\_a <= #10 2'b10;

reg\_b <= #5 2'b01;

- Equal symbol is used '=' symbol is used '<='.

### Parameter's/define

Parameters are used to specify constants.

### Finite state machines(FSMS)

- State are 4.
- Using 4 flipflops.
- Synchronous & asynchronous reset.
- Verification role in IC design.
- Front-End VLSI (deals with RTL coding).
- Back-End VLSI (deals with circuit/physical design).

*Sales V.*