



Bharatiya Vidya
Bhavan



Let noble thoughts come to us from every side



‘SCOPE’



**Skill Certification for Outcome-Based
Professional Education**

<http://scope.spit.ac.in>

Scope for successful professional career.



Why SCOPE?

- **Training programmes to develop technical skills in learners.**
- **Outcome based model**
- **Every course shall have focused learner centric expected outcome**
- **Focus: Employability, Innovation and Research**



Why SCOPE?

- **SCOPE is a tool to enhance career prospects and orient learners towards self learning.**
- **Cafeteria model with ‘collaborative learning’, ‘blended learning’ and project based learning (PBL).**
- **Freedom of choice to learner to design their own combination of studies to get domain “proficiency”.**
- **Courses which are in demand in industry**



Why SCOPE?

➤ **Total 24 modules each containing 6 courses.**

Total number of courses=144

➤ **Flexibility in course timings
(after 4.00 pm or on Saturday-Sunday)**

➤ **Interdisciplinary enrollment possible**

➤ **Peer Learning Groups and discussion forums**

What is available under SCOPE?





SCOPE Introduction Page



Skill Certification for Outcome-based Professional Education



SCOPE is an initiative of the Sardar Patel Institute of Technology. Through this initiative, we offer 40 hours hands-on training courses and certification in various topics.

Online course: These courses are open for students from all science, polytechnic and engineering colleges.

For more information about this initiative [click here >>](#)



[Browse Courses](#)

Currently Open Courses

Front-End VLSI Design & Verification
Ch.1 - Fundamentals of FPGA and CPLD

FUNDAMENTALS OF FPGA AND CPLD
Dr. Surendra S. Rathod
Professor, S.P.I.T.
Course duration :
January 23, 2017 – April 14, 2017
Course Fee: Rs. 5000/- (Rs.3000/- for S.P.I.T. students)

Last date for enrollment : 23 Jan, 2017

REGISTRATION OPEN

Electronic Product Design
Ch.1 - Python Programming for Single Board Computers

PYTHON PROGRAMMING FOR SINGLE...
Mr. Ganesh Gore
Chief Technical Officer at Eduvance
Course duration :
January 23, 2017 – April 14, 2017
Course Fee: Rs. 5000/- (Rs.3000/- for S.P.I.T. students)

Last date for enrollment : 23 Jan, 2017

REGISTRATION OPEN

Electronic Product Design
Ch.1 - Rapid Embedded System Design

RAPID EMBEDDED SYSTEM DESIGN
Dr. Jonathan Joshi
CEO, Eduvance
Course duration :
January 23, 2017 – April 14, 2017
Course Fee: Rs. 5000/- (Rs.3000/- for S.P.I.T. students)

Last date for enrollment : 23 Jan, 2017

REGISTRATION OPEN

Course Assessment

Final Composite Score will be calculated as: 20% Online pre-lecture assignment + 40% Assessment during Hands-on Training + 40% Project. Graded Certificate will be given to all the learners.

Based on the composite score there are FIVE types of certificates.

- GOLD (A+):** Marks \geq 90%
- SILVER (A):** 90% > Marks \geq 80%
- BRONZE (B+):** 80% > Marks \geq 70%
- SUCCESS (B):** 70% > Marks \geq 60%
- PARTICIPATION:** 60% > Marks

Certificate will have your name, photograph and the score in the final exam.

Learners who does not submit assignments and/or projects but attend all the hands-on sessions shall be given participation certificate without any grade





Modules Offered (6 per department)

Electronics Engineering Department:

1. Front End VLSI Design and Verification
2. Back End VLSI Design
3. Electronic Product Design
4. Advanced Instrumentation
5. DSP, Power Electronics and Control
6. Antennas and Networking

Electronics and Telecommunication Engineering Department:

1. Cyber-Physical and Embedded Systems
2. Simulation and Modeling
3. Networking and Security
4. Multimedia Communication Systems
5. RF System and Design
6. Telecommunication Engineering Practices

Computer Engineering Department:

1. Expert System Design
2. CGI Scripting and Text Processing
3. Multimedia and Web Designing
4. Internet of Things
5. IT Infrastructure, Systems and Security
6. Big Data Analytics and Applications

Information Technology Department:

1. Web Designing
2. Game Designing And Deployment
3. Infrastructure Security
4. Social Media Analysis
5. Coding Skill
6. Banking And Finance

Home > Courses

Courses

Electronics Engineering

1. Front End VLSI Design and Verification
2. Back End VLSI Design
3. Electronic Product Design
4. Advanced Instrumentation
5. DSP, Power Electronics and Control
6. Antennas and Networking

Electronics and Telecommunication Engineering

1. Cyber-Physical and Embedded Systems
2. Simulation and Modeling
3. Networking and Security
4. Multimedia Communication Systems
5. RF System and Design
6. Telecommunication Engineering Practices

Computer Engineering

1. Expert System Design
2. CGI Scripting and Text Processing
3. Multimedia and Web Designing
4. Internet of Things
5. IT Infrastructure, Systems and Security
6. Big Data Analytics and Applications

Information Technology

1. Web Designing
2. Game Designing And Deployment
3. Infrastructure Security
4. Social Media Analysis
5. Coding Skill
6. Banking And Finance

Department-wise Modules Offered

Click on a module to find out a course



Courses Offered Under Each Module

ELSD1:Front End VLSI Design and Verification	ELSD2:Back End VLSI Design
ELSD13: Verilog Programming for FPGA-I ELSD14: Verilog Programming for FPGA-II ELSD15: System Verilog for Verification ELSD16: FPGA based System Design ELSD17: Soft Processors and SoC Programming ELSD18: Static Timing Analysis	ELSD23: SPICE programming-I ELSD24: SPICE programming-II ELSD25: Device simulation with TCAD ELSD26: MOSFET Modeling ELSD27: Low Power VLSI ELSD28: Mixed Signal VLSI
ELSD3:Electronic Product Design	ELSD4:Advanced Instrumentation
ELSD33: Python Programming for Single Board Computers ELSD34: Rapid Embedded System Design ELSD35: Efficient Embedded System Design ELSD36: Protocols and Standards ELSD37: Embedded Linux ELSD38: RTOS Programming	ELSD43: Labview Programming-I ELSD44: Labview Programming-II ELSD45: Data Acquisition and Control-I ELSD46: Data Acquisition and Control-II ELSD47: PLC and SCADA Programming ELSD48: Development of Healthcare Platform
ELSD5:DSP, Power Electronics and Control	ELSD6:Antennas and Networking
ELSD53: MATLAB Programming-I ELSD54: MATLAB Programming-II ELSD55: Solar System Components and Design ELSD56: Simulation tools for Power Electronics ELSD57: Applications of Digital Signal Processors ELSD58: Digital Control System	ELSD63: Fundamentals of Networking ELSD64: Network Simulation Tools ELSD65: Simulation of Radiating Elements ELSD66: Design, Implementation and Testing of Radiating Elements ELSD67: IP Subnetting and Supernating ELSD68: Wireless Network Security



Courses Offered Under Each Module

ETSD1: Cyber-Physical Systems	ETSD2:Simulation and Modeling for Wireless and Mobile Communication
ETSD13:PCB Design ETSD14: Internet of Things (IoT) Sensing Systems ETSD15: Internet of Things (IoT) Actuating Systems ETSD16: SDR and USRP ETSD17:Application of DSP Hardware for Smart Antennas System ETSD18: Software Defined Network (SDN) Design	ETSD23: Channel Modeling using Scilab ETSD24: Scripting Languages Perl and Python ETSD25: NS2 and NS3 ETSD26: SDR using GNURADIO ETSD27: WLAN Optimization ETSD28: Signal Monitoring
ETSD3: Networking and Security	ETSD4:Multimedia Communications Systems
ETSD33:Fundamentals of Networking ETSD34:Network Operating System and Linux ETSD35: Network Troubleshooting and Switch Configuration ETSD36:Firewall Administration ETSD37: Server Optimization and Security ETSD38: Cryptography and PKI	ETSD43: Fundamentals of Multimedia Standards ETSD44: Image and Video Processing using OpenCV and FFMPEG ETSD45: LAN Telephony & VoIP Administration ETSD46: Video Streaming ETSD47: Implementation of CODEC ETSD48: Error Correcting Codes
ETSD5:RF System and Design	ETSD6:Telecommunication Engineering Practices
ETSD53: Antenna Design, Fabrication and Testing ETSD54: Plannar Array Design, Fabrication and Testing ETSD55: Wearable Antenna Design, Fabrication and Testing ETSD56: UWB Antenna & Mutual Coupling Reduction ETSD57: Metamaterials I ETSD58: Metamaterials II	ETSD63: Fundamentals of Reliability Engineering ETSD64: Stress Testing Techniques ETSD65: Telecommunication Regulations and Safety and Economics ETSD66: Wireless Network Planning, Design and Optimization ETSD67: Wireless Network Testing ETSD68: Technology Obsolescence



Courses Offered Under Each Module

<p>CESD1: Expert System Design</p> <p>CESD13: Fundamentals of Expert System CESD14: Neural Network Algorithm CESD15: Machine Learning Algorithm CESD16: Design of Artificial Neural Network CESD17: Deep Learning CESD18: Application Development Using Neural Network and Machine Learning</p>	<p>CESD2: CGI Scripting and Text Processing</p> <p>CESD23: Shell Scripting CESD24: Perl Scripting CESD25: Python Programming CESD26: Ruby on Rails Programming CESD27: Application Development with Scripting Languages CESD28: Text Processing Tools</p>
<p>CESD3: Multimedia and Web Designing</p> <p>CESD33: Graphics Designing: Adobe Photoshop & Corel Draw CESD34: 2D Animation: Flash Professional CESD35: 3D animation: 3D Studio MAX & MAYA CESD36: Movie Making & Sound : Flash & Sound Forge CESD37: Game Development: 3D Studio MAX & MAYA CESD38: Web Designing: Adobe Dreamweaver</p>	<p>CESD4: Internet of Things</p> <p>CESD43: Fundamentals of IoT CESD44: IoT Communication Models & Protocols CESD45: IoT Sensor Networks CESD46: Data Management & Analytics for IoT CESD47: Programming Technologies for IoT CESD48: IoT Cloud Platform</p>
<p>CESD5: IT Infrastructure, Systems and Security</p> <p>CESD53: Computer Network Administration CESD54: Information Security CESD55: Network Defense and Countermeasures CESD56: Cyber Security and Forensic CESD57: Public Key Infrastructure CESD58: Data Center Management</p>	<p>CESD6: Big Data Analytics and Applications</p> <p>CESD63: Fundamentals of Data Analytics CESD64: Prediction Analytics: Regression and Classification CESD65: Prediction Analytics: Time Series, Decision Tree and Neural Network CESD66: Big Data Analytics: Hadoop and Spark CESD67: Big Data Analytics: Scala CESD68: Data Analytics Applications</p>



Courses Offered Under Each Module

ITSD1: Web Designing		ITSD2: Game Designing And Deployment	
ITSD13:	Web Programming Fundamentals	ITSD23:	Digital imaging
ITSD14:	Client And Server Side Scripting	ITSD24:	Desktop Game Development
ITSD15:	Mobile App Development	ITSD25:	Android Game Development
ITSD16:	UI Design	ITSD26:	Multiplayer games
ITSD17:	Web Security	ITSD27:	Game Control Using OpenCV
ITSD18:	Web Analytics	ITSD28:	Game Development Using Virtual Reality
ITSD3: Infrastructure Security		ITSD4: Social Media Analysis	
ITSD31:	Network Configuration & Troubleshooting	ITSD41:	Data Collection Techniques
ITSD32:	Network Programming	ITSD42:	Handling Unstructured Data
ITSD33:	Network Simulators	ITSD43:	Analysis Using R-Tool
ITSD34:	Ethical Hacking	ITSD44:	Image Analysis
ITSD35:	Wireless Security	ITSD45:	Recommendation System
ITSD36:	Digital Forensics	ITSD46:	Visualization Of Data
ITSD5: Coding Skill		ITSD6: Banking And Finance	
ITSD51:	Shell Scripting	ITSD61:	Statistical Analysis
ITSD52:	Programming In C++	ITSD62:	Financial Planning
ITSD53:	Android Programming	ITSD63:	Cost Accounting
ITSD54:	Python Programming	ITSD64:	Market Analysis
ITSD55:	Struts &Hibernate	ITSD65:	Stock & Shares
ITSD56:	Ruby On Rails (ROR) Framework	ITSD66:	Security Audit



Course Registration

Course registration has to be done online on SCOPE webpage before the registration for the course closes.

Registration Charges (Inclusive of taxes):

S.P.I.T. Students=Rs. 3000/-- per course

Others=Rs. 5000/-- per course

**Money shall be paid by Cheque in favor of
S.P.I.T. Allied Division**

**Submit cheque before deadline to respective
course co-ordinators**



Course Registration

No-Refund Policy:

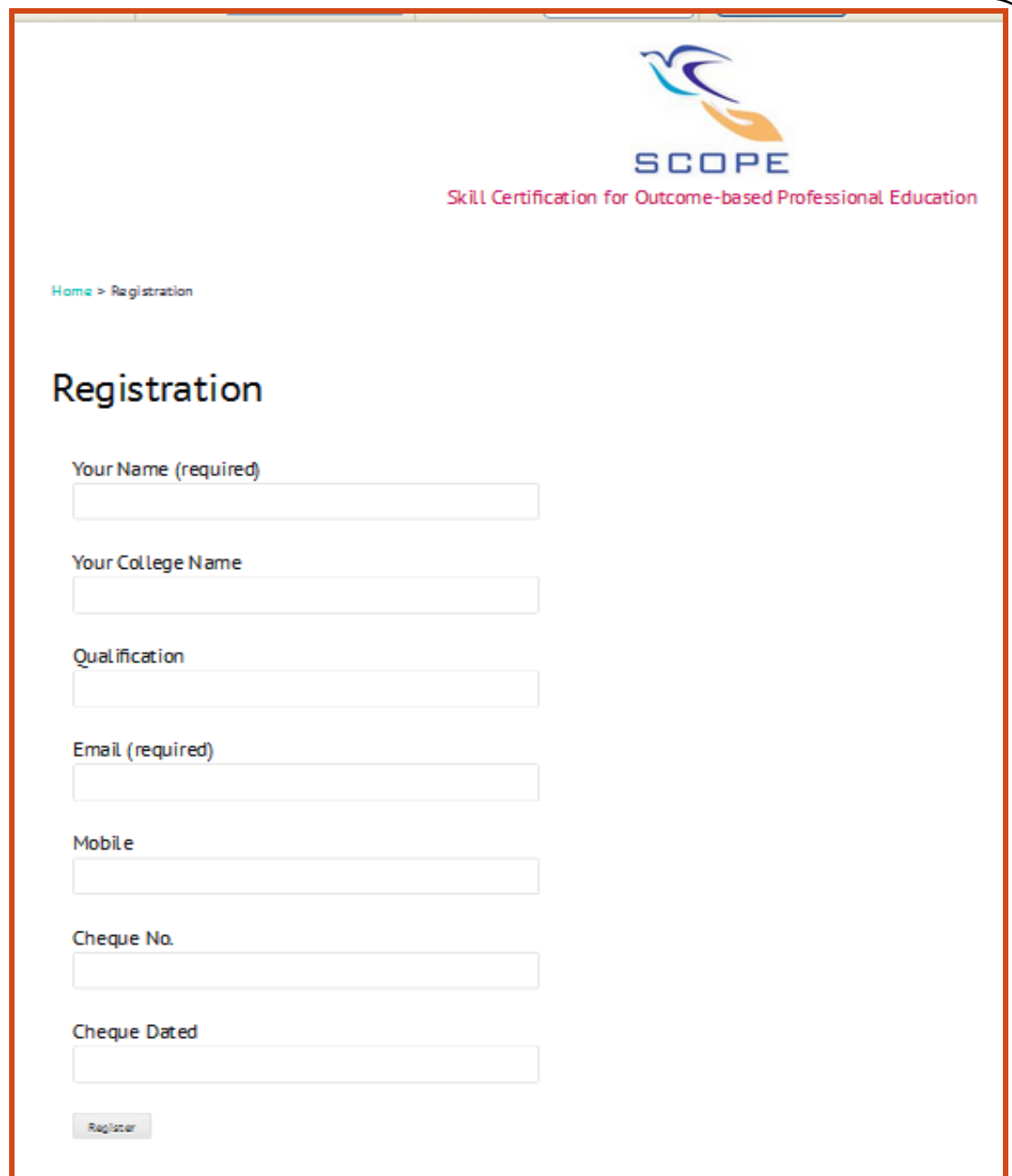
Once registration for the course is confirmed then registration money shall not be refunded under any circumstances.

Credits to S.P.I.T. students:

After completion of one complete module learner get 2 extra credits at the end of VIII semester. 'Proficiency' obtained shall be listed in the grade card.



Course Registration Page

A screenshot of a web registration page for SCOPE (Skill Certification for Outcome-based Professional Education). The page features the SCOPE logo at the top right, which consists of a stylized bird-like figure in blue and orange above the word "SCOPE" in blue. Below the logo is the text "Skill Certification for Outcome-based Professional Education" in red. A breadcrumb trail "Home > Registration" is visible. The main heading "Registration" is in large black font. Below it are several input fields: "Your Name (required)", "Your College Name", "Qualification", "Email (required)", "Mobile", "Cheque No.", and "Cheque Dated". Each field is a simple white box with a thin border. At the bottom left of the form area is a grey button labeled "Register".

SCOPE
Skill Certification for Outcome-based Professional Education

[Home](#) > Registration

Registration

Your Name (required)

Your College Name

Qualification

Email (required)

Mobile

Cheque No.

Cheque Dated

Course Introduction Page

Learners Log-in

Course Outline



SCOPE
Skill Certification for Outcome-based Professional Education

Home > Courses > Electronics Engineering > Front End VLSI Design and Verification > Fundamentals of FPGA and CPLD

Fundamentals of FPGA and CPLD

[Learners Login](#)

About the course
Reconfigurable platforms like FPGA and CPLDs have now become synonymous to high performance electronic systems. Knowledge of these platforms along with Verilog programming language is essential for science, electronics, communication, instrumentation and electrical engineering students. Also computationally intensive applications at places like Stock Exchanges, defense systems are now based on these platforms. Hence computer and IT professionals should also have working knowledge of these tools.

This training will be an intensive 40 hours course that will involve the design and implementation of various aspects of Front End VLSI that will be tested using Field Programmable Gate Arrays. This course will teach the learners simulation and hardware concepts of designing digital circuits. This course will involve mini-project and one main course project.

Pre-requisites
Digital System Design

Industries where this course will be useful
Several hardware design companies and EDA companies like Xilinx, Altera, Broadcom, Intel, Arm, Cadence, Sankalp Semiconductors etc. Many small scale industries in India do FPGA based design.

Course Outcomes

1. Ability to design a hardware using Verilog HDL
2. Ability to perform physical verification of the designed Hardware on FPGA
3. Ability to use various modeling techniques as per the requirement
4. Ability to write Test-benches for verification

Course Instructor



Dr. Surendra S. Rathod received Ph.D. from I.I.T. Roorkee. Currently he is working as professor at Sardar Patel Institute of Technology Mumbai. He has 19 years of teaching experience. His special fields of interest include VLSI design, device modeling and circuit simulation. He has guided several UG and PG projects in the domain of VLSI, embedded systems and instrumentation. He is also Ph.D. guide of Mumbai University. He has worked on various platforms of SoC, FPGA, CPLD and microcontrollers. He has proficiency in SPICE, VHDL, Verilog, SystemVerilog, Xilinx ISE, Vivado, CoventorWare, COMSOL and LabVIEW programming.

He received recognition as IUCEE (Indo Universal Collaboration for Engineering Education) faculty fellow in 2016. He is also awarded as distinguished professor & distinguished HOD by CSI in 2017. He also received ISTE Best Engineering Faculty award in 2012.



Mr. Ganesh Gore is currently the Chief Technical Officer (C.T.O) at Eduvance. He has over 8 years of Experience in the field of Electronic Systems Design, Embedded Systems, High Speed System Design, Circuit Board Design, Circuit Simulations and Device Modeling.

He has successfully taken over 50 projects from concept to market with different companies in a variety of domains such as Systems Control, Healthcare, Defense and Education. Ganesh's most noteworthy project has been the launch of the Eduvance RemoLabs, a first of its kind online embedded systems learning platform. He has been a Research fellow at IIT Bombay where he worked on Circuit Simulations and Device Modeling. He has worked on a variety of technologies and platforms such as PIC, AVR, Bluetooth, GPS, WIFI, FPGA and Software controlled Embedded Systems. He also has various patents filed in his name.



Prof. Pawankumar Fakatkar is currently working as an Assistant Professor in Electronics Engineering Department at Sardar Patel Institute of Technology, Mumbai. He has 13 years of experience in training and skill development programs. His areas of interest are embedded systems, circuit simulation and VLSI design. Pawankumar is involved in Research related to Social Innovations. He received Techno Inventor award from Indian Electronics and Semiconductor Association for his outstanding contribution for his project in water quality monitoring. He has worked on various platforms like ARM, PIC, AVR, Zynq 7000 SOC, Cypress PSOC and Xilinx FPGAs. Pawankumar holds a Master's degree in Electronics and Telecommunication Engineering Bachelor's degree in electronics engineering from the University of Mumbai.

Course Layout

- Session – 1 : Introduction to FPGA design flow from conceptualization to physical implementation
- Session – 2 : Introduction of FPGA based Designs and Basic Digital Elements.
- Session – 3 : Hardware Description language Introduction to Verilog HDL – Difference between programming language and HDL Fundamentals of Verilog HDL (Behavioral, Dataflow and Structural modeling)
- Session – 4 : Implementation of Combinational Circuit design Concepts
- Session – 5 : Interfacing on Board Switches and Seven Segment with FPGA
- Session – 6 : Implementation of Mini Project – Universal Barrel Shifter
- Session – 7 : Design verification Understanding RTL Schematic
- Session – 8 : Concept of Testbench for VLSI designs, Types and Structure of testbenches
- Session – 9 : Writing Linear Testbench and Simulation for verification



Content Delivery

- **Flip-Classroom Mode**
- **10 Hours theory under Self-learning**
 - Self learning material will open to registered learners after registrations closes
 - Material may be in the form of pdf/multimedia
- **20 Hours contact for extensive hands-on training**
- **10 Hours of mentored project**



Industry Involvement

- **Content Design by Industry Expert**
- **Content Delivery in some of the courses**
- **Autograder designed by industry experts for assessment in some of the courses**
- **Case studies and applications**
- **Industry Mentor**

Announcements

Course Resources

- Session 1
 - Introduction
 - FPGA Design Flow
 - FPGA vs ASIC Design Flow
- Session 2
 - Basic FPGA HDL Coding Techniques
 - Spartan-3 FPGA HDL Coding Techniques
- Session 3
 - XST Synthesis Options
 - FrontEnd VLSI Basics Of Verilog Part I
- Session 4
 - FrontEnd VLSI Basics of Verilog Part II
 - Front End VLSI Introduction to FPGA
- Session 5
 - Front End VLSI Introduction to FPGA Classroom
 - Front End VLSI Blocking and Non Blocking statements Part I
- Session 6
 - Front End VLSI 2015 Blocking and Non Blocking Part II
 - Front End VLSI 2015 Concept of Blocking and Non Blocking
- Session 7
 - Front End VLSI 2015 Concept of Pipelining
 - Front End VLSI Finite State Machine Part I
- Session 8
 - Front End VLSI Finite State Machine Part II
- Session 9
 - Front End VLSI Finite State Machine Part III
- Session 10
 - Front End VLSI Design 2015 Finite State Machines

Learning
Resources

Discussion Forum

Discussion
Forum



Assessment

Composite Score:

Online pre-lecture assignment=20%

+

Assessment during Hands-on

Training=40%

+

Project=40%

Total=100%



Certification

Types of Certificates:

Based on the consolidated marks we have FIVE types of certificates.

GOLD:

Marks $\geq 90\%$

SILVER:

$90\% > \text{Marks} \geq 80\%$

BRONZE:

$80\% > \text{Marks} \geq 70\%$

SUCCESS:

$70\% > \text{Marks} \geq 60\%$

PARTICIPATION:

$60\% > \text{Marks}$

Certificate Format



GOLD

SCOPE

Skill Certification for Outcome-based Professional Education
Sardar Patel Institute of Technology, Mumbai
(An Autonomous Institute Affiliated to Mumbai University)



This certificate is awarded to

KARAN SHAH

for successfully completing 40 hours course on

“Fundamentals of FPGA And CPLD”

with a composite score (20% pre-lecture assignments + 40% hands-on sessions + 40% project) of

95 % (A+ Grade)



JULY 2017

Prof. Pawankumar Fakatkar
Course Co-ordinator

Dr. S. S. Rathod
Dean Academics

Roll number :SCOPE- 2013110001

To validate and check scores use: weblink



Students Opinion

This is an awesome idea. I would like to enroll immediately for these courses. I am sure that these courses will help me develop proficiency in the area of my interest.

I would prefer to join these courses because of time flexibility and their interdisciplinary nature. I wish would have been an S.P.I.T. student to fetch max credits by attending max. courses.

There is a need for extensive hands-on courses along with proper assessment. Good laboratory set-up available at S.P.I.T. will definitely help in achieving desired outcome of these courses.

Kindly make sure that these courses get enough publicity. My friends in other colleges are always in search of these kind of courses. Please start them as soon as possible.



FAQ

- How these courses are different as compared to NPTEL?
 - These courses are extensive hands-on training courses more focused on practical aspects rather than theoretical knowledge.

- Where do I get information about up-coming certification courses?
 - From institute website www.spit.ac.in

- I just came to know that course that I wanted to join has concluded. Is there any chance of this course being offered again?
 - Yes, it can be offered again in same semester depending on demand by student . For any course if 20 students are enrolled then it can be offered any time. We encourage batch enrollment of minimum 20 students from a particular college.



FAQ

- How do I enroll/register for SCOPE course?
 - Please refer course registration page on institute website <http://onlincecourses.spit.ac.in>
- Is there a fee to enroll for a course and how to pay? Can I pay online?
 - Yes there is a fee for every course. You can pay by cheque in favor of S.P.I.T. Allied Division. Soon online payment module will be activated.
- What is the eligibility criterion for registering for a course?
 - Self motivation and pre-requisite knowledge.
- Is there any restriction on branch for attending a particular course
 - These are interdisciplinary courses. Student from any branch can attend any course provided that he has learned pre-requisite which shall be verified by course co-ordinator.



FAQ

- In which class FE/SE/TE/BE I should be to register for a course?
 - Student from any class can attend any course
- How many courses can I enroll for at a time?
 - Technically you can enroll for as many courses as you wish. However you are recommended to see the dates of the courses and then enroll.
- How will I come to know about assignments and deadlines?
 - They will be available in student login and you will also get Email/SMS alert.
- Will the score that I get for the assignment(s) be counted along with my exam marks for the final score?
 - Yes 20% weightage will be given to your assignment(s) score.



FAQ

- I may not be able to submit all the assignments. Will this hinder my final score?
 - If you are not able to submit assignments then your score shall be affected. But you have chance to score during hands-on session evaluation and project evaluation.
- Does institute have sufficient laboratory facilities to run these courses.
 - Yes. We are starting only those courses for which we have laboratory facilities.
- Is there any placement provided after attending these courses?
 - No, we do not guarantee. Direct placement is not provided. These courses are skill based highly focused on outcome. Since you become proficient in one of the domain after completing a particular module. Your chances of employability increases.



For Any Information Contact:

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Dean Academics

Sardar Patel Institute of Technology

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Thank You