VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

AICTE Approved; UGC Autonomous; JNTUH Affiliated; UGC "College with Potential for Excellence"; NAAC "A++" Grade

ISO 9001:2015 Certified; QS I.GAUGE "Diamond" Rated; NIRF 2020: 127th Rank Engineering (151–200 Band Overall)

NBA Accredited: CE, CSE, ECE, EEE, EIE, IT, ME; JNTUH-Recognised Research Centres: CE, CSE, ECE, EEE, ME

DEPARTMENT OF ELECTRONIC AND COMMUNICATION ENGINEERING

M. Tech (VLSI SYSTEM DESIGN)

About the Programme:

Master of Technology in ***VLSI System Design*** is a two-year post-graduate programme dedicated to enlightening students with the designing, implementing and testing of the VLSI IC to make it viable, maintainable, and affordable. The programme offer students with a strong base of VLSI principles and applications in scientific and engineering domains.

Brief view of the Programme:

- ✓ **Programme Name:** M. Tech (VLSI System Design)
- ✓ **Duration:** 2 Years (4 Semesters)
- ✓ **Offered by the Department:** Electronics & Communication Engineering
- ✓ **Programme offered since:** 2003
- ✓ **Sanctioned Intake**: 18

Our Prominent Recruiters

Objectives of the Programme:

- Identify, Design and analyze solutions to the problems in areas like semiconductor technologies, VLSI Design, verification and testing.
- Design and implementation of VLSI architectures using FPGA
- Use the techniques, skills, modern Electronic Design Automation (EDA) tools to evaluate and analyze the performance of the systems in VLSI domain.

Expected outcomes / deliverables of the programme:

After the successful completion of the programme, students of the programme will exhibit the following attributes:

- An ability to independently carry out research / investigation and development work to solve practical problems.
- An ability to write and present a substantial technical report / document.
- Students should be able to demonstrate a degree of mastery over the area as per the specialization of the programme. The mastery should be at a level higher than the requirements in the appropriate bachelor programme.
- Recognize the need to engage in lifelong learning with ethical values that helps to explore all dimensions of VLSI Design and contemporary technologies which helps in overcome challenges in VLSI domain.
- Apply acquired knowledge from undergraduate engineering and other disciplines to identify, formulate and present solutions to technical problems related to various areas of VLSI.

- ❖ Learn advanced technologies and analyze complex problems in the fields of VLSI.
- ❖ Addressing specific problems in the field of VLSI system design in the form of mini projects, analysis and interpretation of data and synthesis of information to provide valid conclusions.
- ❖ Use the techniques, skills, modern Electronic Design Automation (EDA) tools, software and equipment necessary to evaluate and analyze the systems in VLSI design environments.
- ❖ Understand and commit to professional ethics, social responsibilities and norms of engineering practice.
- ❖ Demonstrate effective oral and written communication skills in accordance with technical standards.
- ❖ Become knowledgeable about contemporary developments.
- ❖ Ability to correct the mistakes effectively and learn from them to become good leaders.
- ❖ Understand the scenario of global business.

Unique outcomes / deliverables of this Programme include:

- Applying knowledge of VLSI in solving the issue related to domains like Defense, Biomedical, communication etc
- Utilizing Computer Aided Design (CAD) tools to analyze the performance of the systems in VLSI

VLSI System Design Programme Highlights:

- M. Tech VLSI System Design is a PG programme is approved by UGC, AICTE and JNTU Hyderabad
- It is of four semesters that makes the student to explore contemporary technologies and makes the student industry ready with a focus towards research and promotes self-learning.

- Dedicated faculty with rich experience to provide exploration of good opportunities.
- This offers a set of core programs and elective programs, allowing students to specialize in Internet of Things, Machine Learning, VLSI Design and Testing methodologies.
- This programme makes use of Languages such as Verilog HDL, System Verilog and UVM, Platforms, and Libraries related to EDA Tools such as Synopsys, Xilinx, Mentor graphics, MATLAB.
- Improves the research methodology and self-learning using Technical seminars and project works.
- The Dissertation (Major Project Work) in the third and final semester enables students to closely work with faculty with funded projects with good stipend / work with industry using internships that enables the student to see many opportunities after the graduation and they project their project work in renowned journals or conferences.
- This programme uses a Continuous Evaluation System, mentoring and monitoring by a dedicated programme coordinator who will assist the students in the entire journey of 2 years of the programme and motivates the students towards the dreams accomplishment.
- Uses the latest teaching methodologies like WIT & WIL, Programme Based Projects, Learning by Doing, Lab Protocol, Story Board that escalates the learning process of the students.
- Visit to industry premises in regular time that stimulates the students to be ready for industry orientation / research promotion.
- Facilitates the student world-class infrastructure like High-end computing facility (Dedicated servers, GPUs, LMS and High-end PCs)

Programme Curriculum:

The programme curriculum of VLSI System Design is designed that meets the aspirations of the industry with practical approach, research orientation and with great social impact. The curriculum includes programs related to Core contents of the Course, Professional electives and Open electives. In each elective the Course offers a collection of rich and contemporary programs that enables the student a good choice.

Semester-1 **R18**

Course Type	Course Code	Name of the Programme	L	T	P	Contact Hours/Week	Credits
Professional Core-I	18PC1VS01	RTL Simulation and Synthesis with PLDs	3	0	0	3	3
Professional Core-II	18PC1VS02	Digital IC Design	3	0	0	3	3
Professional Core-III	18PC1VS03	Analog IC design	3	0	0	3	3
Professional Elective-I	18PE1VS01	Internet of Things	3	0	0	3	3
	18PE1VS02	Full Custom IC Design					
	18PE1VS03	VLSI Process Technology					
Professional Elective -II	18PE1VS04	Parallel Processing	3	0	0	3	3
	18PE1VS05	Advanced Digital Signal Processing					
	18PE1VS06	Semiconductor Device Modeling					
Professional Core Lab-I	18PC2VS01	RTL Simulation and Synthesis with PLDs Laboratory	0	0	3	3	1.5
Professional Core Lab-II	18PC2VS02	IC design Laboratory	0	0	3	3	1.5
Project	18PW4VS01	Technical Seminar	0	0	4	4	2
Audit	18AU5CS01	Research Methodology & IPR	2	0	0	2	0
Total			**17**	**0**	**10**	**27**	**20**

Semester-2 **R18**

Course Type	Course Code	Name of the Programme	L	T	P	Contact Hours/Week	Credits
Professional Core-IV	18PC1VS04	Mixed Signal and RF IC Design	3	0	0	3	3
Professional Core-V	18PC1VS05	VLSI Design Verification and Testing	3	0	0	3	3
Professional Core-VI	18PC1VS06	Low Power VLSI Design	3	0	0	3	3
Professional Elective-III	18PE1VS07	SOC and NOC Architectures	3	0	0	3	3
	18PE1VS08	Optimization Techniques in VLSI Design					
	18PE1VS09	Scripting Languages for VLSI					
Professional Elective-IV	18PE1VS10	Physical Design Automation	3	0	0	3	3
	18PE1VS11	Image and Video Processing					
	18PE1VS12	Memory Technologies					
Professional Core Lab-III	18PC2VS03	Mixed Signal and RF IC Design Laboratory	0	0	3	3	1.5
Professional Core Lab-IV	18PC2VS04	VLSI Design Verification and Testing Laboratory	0	0	3	3	1.5
Project	18PW4VS02	Mini-Project	0	0	4	4	2
Audit	18AU5EN01	English for Academic and Research Writing	2	0	0	2	0
Total			**17**	**0**	**10**	**27**	**20**

Semester-3 **R18**

Course Type	Course Code	Name of the Programme	L	T	P	Contact Hours/Week	Credits
Professional Elective-V	18PE1VS13	Selected Topics in Mathematics	3	0	0	3	3
	18PE1VS14	VLSI Signal Processing					
	18PE1VS15	Nano materials and Nanotechnology					
Open Elective	18OE1CN01	Business Analytics	3	0	0	3	3
	18OE1AM01	Industrial Safety					
	18OE1AM02	Operations Research					
	18OE1MG01	Cost Management of Engineering Projects					
	18OE1AM03	Composite Materials					
	18OE1EE01	Programming Languages for Embedded Software					
Project	18PW4VS03	Dissertation Phase- I	0	0	16	16	8
Total			**6**	**0**	**16**	**22**	**14**

Semester-4 **R18**

Programme Type	Programme Code	Name of the Programme	L	T	P	Contact Hours/Week	Credits
Project	18PW4VS04	Dissertation Phase - II	0	0	28	28	14
Total			**0**	**0**	**28**	**28**	**14**

Total Credits: 68

Eligibility Criteria:

BE/ B. Tech / AMIE in ECE /EEE/EIE or Equivalent.

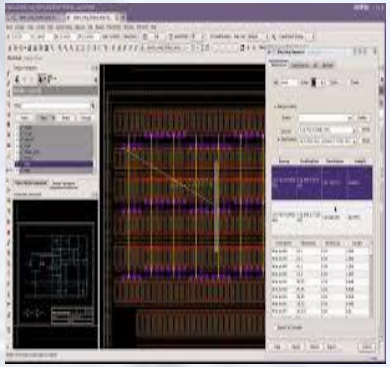
This programme is for individuals who...

are interested in a career of Silicon Semiconductor industries, Aspiring eligible candidates with proficiency in coding, having basics of electronics and zeal to Design VLSI based Applications in areas such as Signal Processing, Image Processing, Biomedical, Satellite & Wireless communication, RFIC, AI, IOT etc.

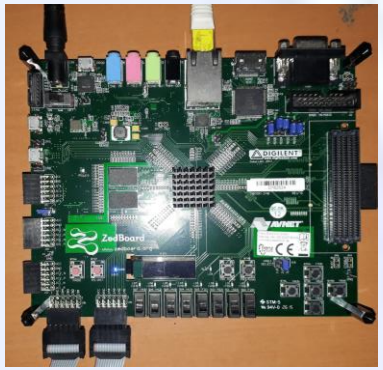
VLSI Laboratory

Interactive sessions with Industry experts

Synopsys tool



ZynQ FPGA Board



Infrastructure

Numerous labs and facilities are set up to cater academic and research needs of the course in the department like Synopsys, Xilinx tools for low power design, Digital design and Verification, ASIC Design, FPGA Design....

- ✓ Synopsys tool package to design an ASIC.
- ✓ Xilinx Vivado tool for implementing Design on FPGA.
- ✓ Availability of various Advanced FPGA boards
- ✓ High end Systems in laboratory to cope-up with the complexity of the VLSI Design
- ✓ Training Sessions are conducted every week by industry experts to bridge the gap between academia and industry

Research Facilities in the Department

Department is equipped with wide range of VLSI software like Synopsys, Xilinx, Matlab, systems with latest configuration to cater to PG programmes for design, modelling and analysis of engineering products and research projects.

Why VLSI System Design Course:

- VLSI industry designs silicon chips for Automotive, Consumer Electronics, Medical, IOT, Artificial Intelligence etc.
- Project based teaching approach and emphasize on latest Industrials trends
- Chance to learn in peaceful and green ambience within campus
- There is Huge Demand for This Skill
- It Pays Handsomely & Big Organizations are Looking forward to getting the persons with good technical skills
- One Can Choose from a Variety of Job Roles
- Demand for the IC related to the rapidly growth of Artificial Intelligence
- Contribute significantly to the industry's overall growth.

Training & Placement

- 14 placed out of 23 eligible students from last two years.
- Students will initially join as a co-op in AMD through internship with 100% employability. After internship period, they may convert to employee with salary package of 10 lakhs.
- 10 students acquired internship in VLSI Domain from last two years.

Career path you can choose after the Course:

- Job Opportunities in Public & Private Sector Organizations
- VLSI Front-End Design
- RTL Design Engineer
- Verification Engineer
- VLSI Back-End Design
- Place and Route (P&R) Engineers
- Physical Design CAD Engineers
- Physical Design Application Engineers for EDA companies like Synopsys, Cadence and Mentor Graphics
- Timing Engineers (STA- Post Layout)
- Low Power Physical Design Engineers
- VLSI Analog Layout Engineers
- Analog Design Engineers
- FPGA Engineers
- Board Design Engineers
- VLSI Post Silicon Validation Engineers
- Design Testing Engineers

MOU with Industries for technology sharing

TATA CONSULTANCY SERVICES

AMD

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