

M.Tech.

VLSI DESIGN AND MICROELECTRONICS



BITS Pilani
Pilani | Dubai | Goa | Hyderabad | Mumbai
**WORK INTEGRATED
LEARNING PROGRAMMES**

HCLTech



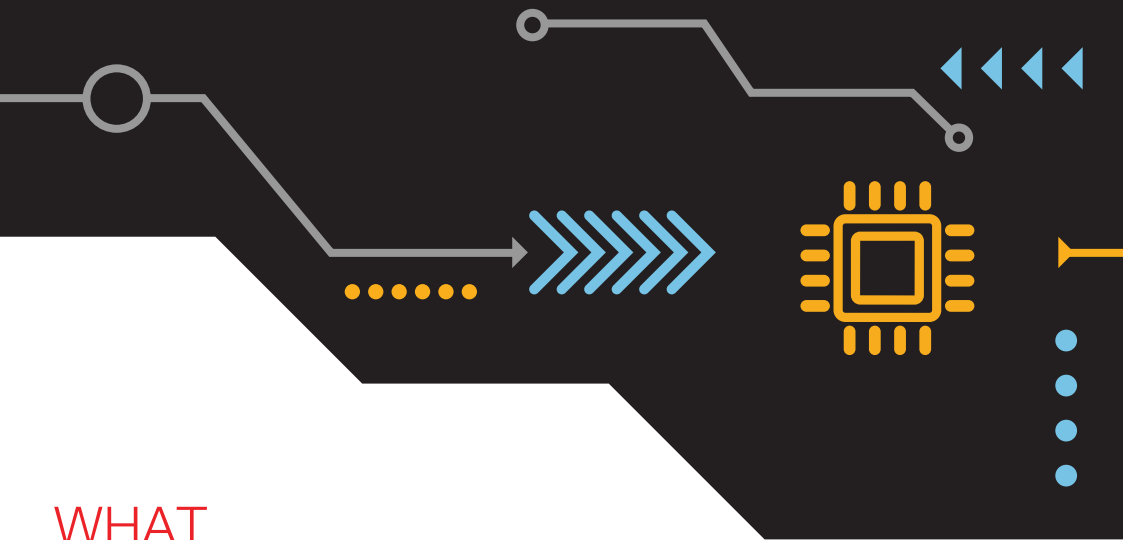
M.Tech. VLSI Design and Microelectronics, a four-semester Work Integrated Learning Programme, is tailored to empower electronics engineers with specialized expertise for designing, fabricating, and testing micro and Nano-scale devices, circuits, and systems.

WHO SHOULD APPLY?

- Ambitious engineers in the Semiconductor industry seeking expertise in system on Chip design, Processor design, IC fabrication, and VLSI CAD. Electronics industry professionals, Micro-Architects, EDA Tool Engineers, and Analog/Digital/Mixed Signal Chip Designers.



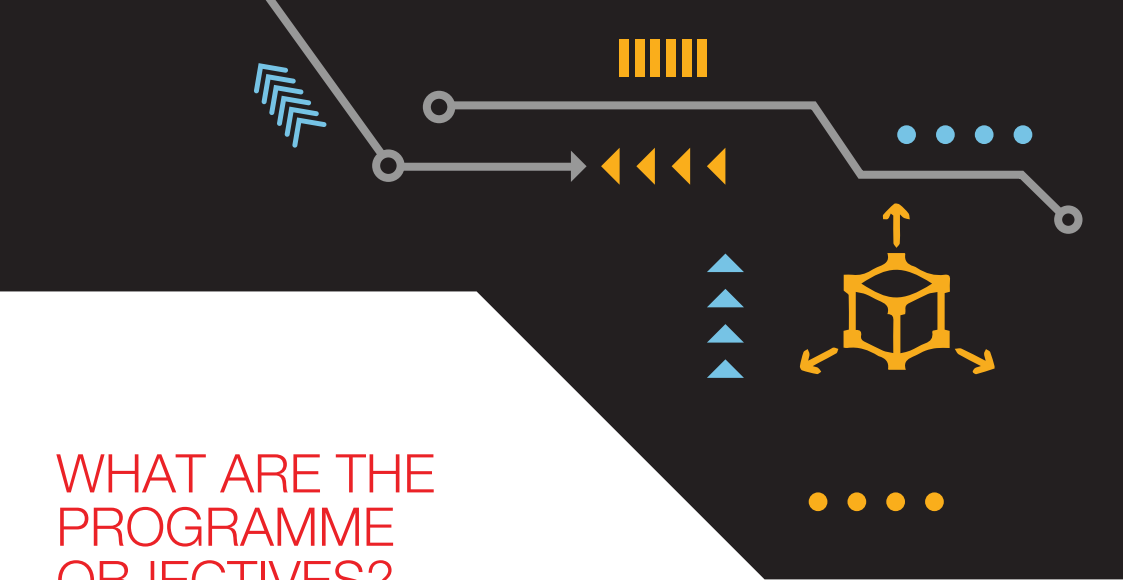
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WHAT ARE THE MAIN HIGHLIGHTS OF THE PROGRAMME?

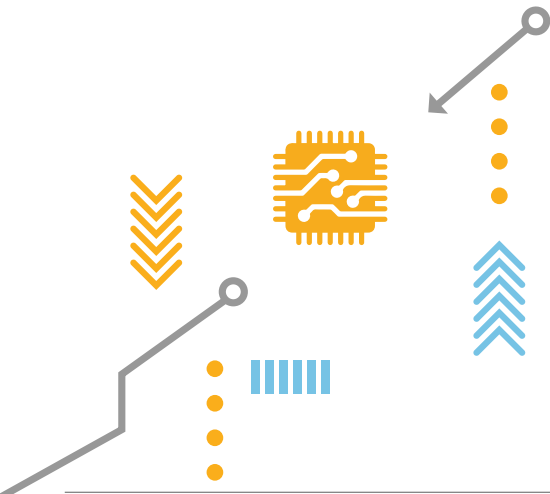
- ▶ The programme will also enable working professionals to attend contact classes from anywhere over a technology-enabled platform. The contact classes will be conducted mostly on weekends or after business hours.
- ▶ The final semester includes a practical Dissertation (Project Work) for real-world application.
- ▶ Emphasizes experiential learning with lab exercises, assignments, case studies, and work-integrated activities
- ▶ The programme offers courses covering back-end and front-end microelectronics, including Processor & SoC Design, Chip Design, VLSI CAD Tool Development, and Semiconductor Fabrication.
- ▶ Participants can access Remote Labs for hardware and software tools used in designing and testing embedded and VLSI systems on platforms like Keil, Multicore STM32, Cadence EDA tools, Vivado, and Xilinx FPGA.
- ▶ Employs Continuous Evaluation to provide ongoing feedback and support.
- ▶ Become a part of elite and global BITS Pilani Alumni community.

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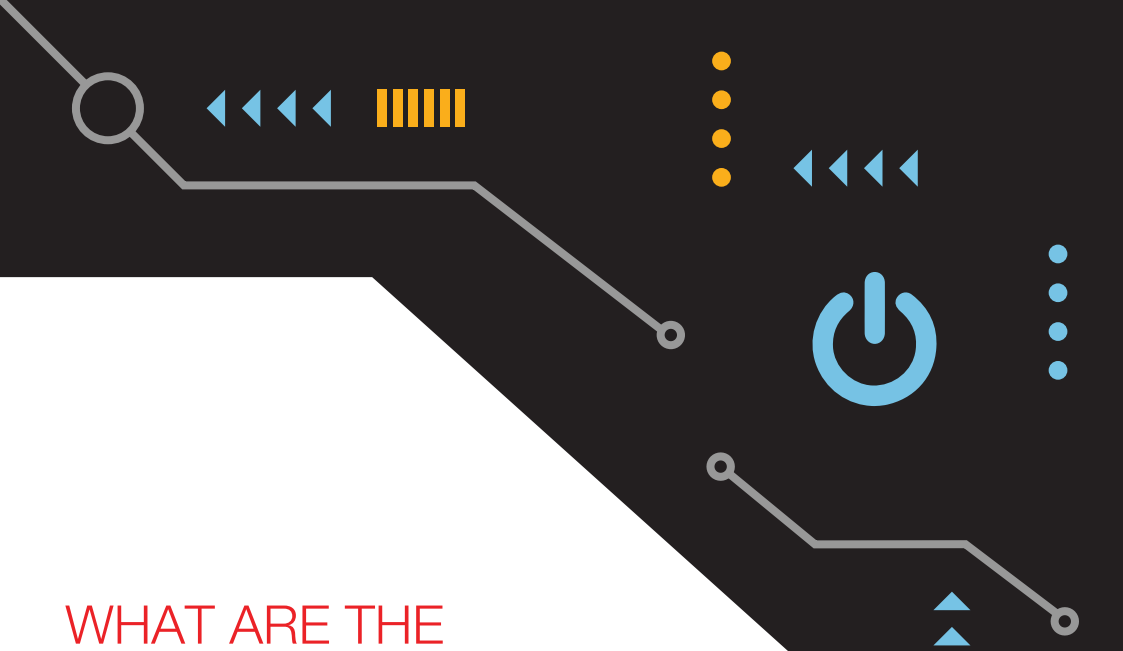


WHAT ARE THE PROGRAMME OBJECTIVES?

- ▶ To design and analyze analog, digital and RF CMOS integrated circuits fundamentals and new paradigms that practicing engineers need to master as a working professional employed in the VLSI domain.
- ▶ To develop both a solid foundation and methods of designing, analyzing and optimizing circuits using EDA tools.
- ▶ To combine theoretical rigor with practical hands-on labs, real-world problem-solving capabilities, lead and innovate in the landscape of semiconductor devices, fabrication technologies, and VLSI design.
- ▶ To emphasize on the intricacies of smart technologies, high speed and low power design technologies using industry standard EDA tools to master design and analysis of complex integrated circuits.
- ▶ Equip participants with the knowledge, skills, and aptitude needed for long-term career growth and increased workplace.



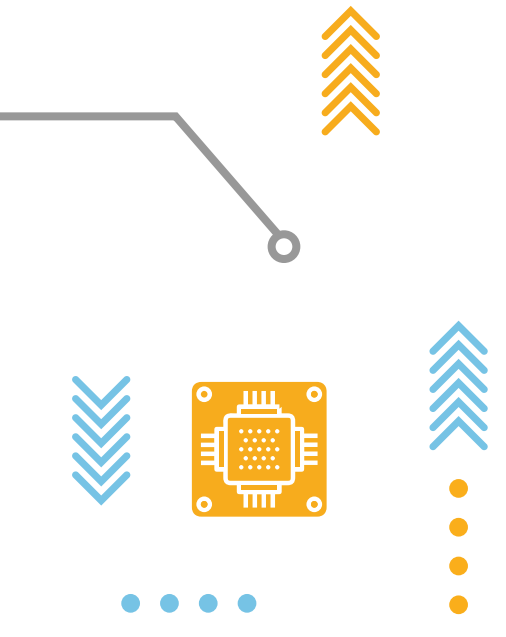
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WHAT ARE THE STUDENT LEARNING OUTCOMES?

Upon completing the programme, learners will be able to:

- ▶ Mastery of fundamental scientific principles governing the operation, design, and fabrication of integrated circuits, covering CPUs, GPUs, and SoCs.
- ▶ Deep understanding of relevant technologies, including integrated circuit process integration and manufacturing.
- ▶ Expertise in both basic and advanced circuit and system design techniques across digital, analog, and RF domains.
- ▶ Proficiency in the application of modern CAD tools and techniques.



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LEARNING METHODOLOGY



ATTEND ONLINE LECTURES OVER WEEKENDS

Lectures are conducted live via online classes. These lectures can be attended via the internet using a computer from any location. These online classrooms offer similar levels of interactivity as regular classrooms at the BITS Pilani campus.

The class schedule is announced within 1 week of completion of the admission process.

The online lectures are conducted usually over weekends for a total of 7-8 hours per week. If you miss a lecture, you can also access the recorded lecture on the internet.



DIGITAL LEARNING

Learners can access engaging learning material at their own pace which includes recorded lectures from BITS Pilani faculty members, course handouts and recorded lab content where applicable.



PROJECT WORK

During the final semester participants carryout a semester-long intensive project work applying the various concepts learnt throughout the program guided by the organisation mentor and supervisor. Participants are provided access to virtual labs where applicable, and faculty expertise to support the project work.



EXPERIENTIAL LEARNING

The programme prioritizes experiential learning, enabling learners to apply classroom concepts in simulated and real work scenarios through remote and virtual lab exercises.

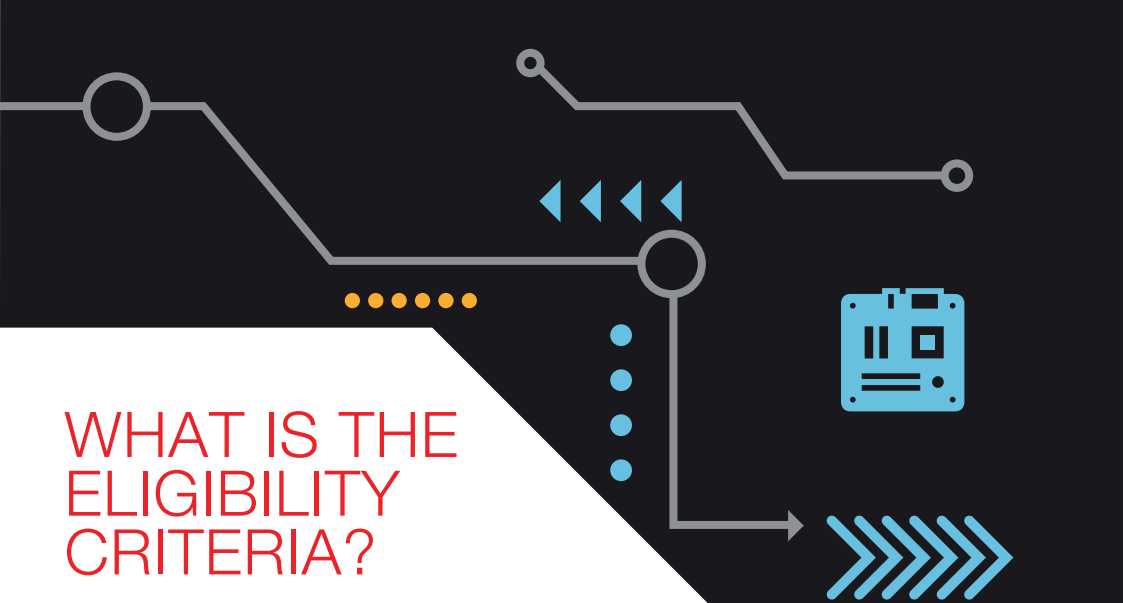
Virtual & Remote Labs: The remote labs provide you with remote access to hardware and software tools that are used for designing and testing embedded systems on various platforms such as MultiCore STM32, Vivado, Xilinx FPGA.



CONTINUOUS ASSESSMENT

Continuous Assessment includes graded Assignments/ Quizzes, Mid-semester exam, and Comprehensive Exam.

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WHAT IS THE ELIGIBILITY CRITERIA?

Employed professionals holding B.E./B.Tech. or equivalent qualification in EE/ECE/E&I/Mechatronics/Computer Science M.Sc. in Physics/Electronics, with at least 60% aggregate marks with minimum one year of work experience in relevant domains.

Applicants must have a minimum of One Year of work experience within HCLTech with a minimum annual rating of "Good & above" in the last appraisal cycle

It is strongly advised to refer and check HCL's policy details and other Eligibility Criteria of the programme before applying, as all fees are non-refundable.

The above are only the minimum criteria to apply. The final decision to offer admission to an applicant rests with BITS Pilani which will be made based on an overall review of your application information.

FEE STRUCTURE

The following fees schedule is applicable for candidates seeking new admission during the academic year 2026-27.

Application Fees
(one time) :INR 1,500

Admission Fees
(one time) :INR 18,500

Semester Fees
(per semester) :INR 73,100



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PROGRAMME CURRICULUM

First Semester-1st year

- MOS Devices and Microfabrication Technology
- Analog IC Design
- CAD for VLSI Design Flow
- VLSI Design

Third Semester-2nd year

- Elective 4
- Elective 5
- Elective 6
- Elective 7

Pool of Electives

Basket – 1 Advanced Digital Systems

- Machine Learning for Electronics Engineers
- SoC Functional Verification
- System on Chip Design
- Testability for VLSI
- Reconfigurable Computing
- Digital Signal Processing
- Advanced Digital Signal Processing
- High Speed SerDes Design
- Advanced VLSI Design
- Advanced VLSI Architectures
- Hardware Accelerators for AI/ML
- EMC and Signal Integrity

Basket – 3 Other Electives

- Introduction to MEMS
- Optoelectronic Sensors, Devices and Communication
- Wireless & Mobile Communication
- Hardware Security
- Embedded System Design
- Novel Memory Concepts and Technology
- Real-Time Embedded Systems

Second Semester-1st year

- VLSI Architecting, the RTL Way
- Elective 1
- Elective 2
- Elective 3

Fourth Semester-2nd year

- Dissertation

Basket – 2 Advanced Analog-Mixed Signal-RF

- RF Microelectronics
- Digitally Assisted Analog Circuits
- Phase and Frequency Synthesis of Analog Circuits
- Advanced Analog and Mixed Signal Design
- Data Converters

- In-Memory Computing
- CAD for IC Design
- Hardware Software Co-Design
- Distributed and Networked Embedded Systems
- Chiplet Design and Packaging
- Quantum Mechanics in Circuits and Systems
- Reliability of Semiconductor Devices

Choice of Electives is made available to enrolled students at the beginning of each semester. A limited selection of Electives will be offered at the discretion of the Institute.

Note: Elective courses have been notionally bucketed. Set of electives will be identified from the pool for a given corporate partner basis of their requirement in consultation. Choice of Electives is made available to enrolled students at the beginning of each semester. A limited selection of Electives will be offered at the discretion of the Institute.

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HOW TO APPLY



- ▶ [Click here](#) to visit the Online Application Center. Create your login at the Online Application Center by entering your official HCL Email ID only and create a password of your choice. Once your login has been created, you can anytime access the Online Application Center using your official email ID and password.
- ▶ Begin by clicking on Step 1 - 'Fill/ Edit and Submit Application Form'. This will enable you to select the programme of your choice. After you have chosen your programme, you will be asked to fill your details in an online form. You must fill all details and press 'Submit' button given at the bottom of the form.
- ▶ Now, click on 'Pay Application Fee' to pay INR 1,500/- using Netbanking/ Debit Card/ Credit Card.
- ▶ Finally, click on 'Upload & Submit All Required Documents'. This will allow you to upload one-by-one all the mandatory supporting documents such academic certificates and transcripts, photograph, etc. and complete the application process.

Acceptable file formats for uploading these documents are .DOC, .DOCX, .PDF, .ZIP and .JPEG

- ▶ Upon receipt of your Application Form and all other enclosures, the Admissions Cell will scrutinise them for completeness, accuracy and eligibility.
- ▶ Admission Cell will intimate selected candidates by email within two weeks of submission of application with all supporting documents. The selection status can also be checked by logging in to the Online Application Centre.

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DISCLAIMER

Ever since it was declared as a Deemed to be University in 1964, BITS Pilani has been offering higher education programmes in science and technology, and has earned an enviable reputation for its innovations in this sphere. The Work Integrated Learning Programmes (WILP) of BITS Pilani constitutes a unique set of educational offerings for working professionals. These programmes, which BITS began to offer in 1979, have, over the years, evolved along the lines envisaged in the National Policy on Education, 1986.

The WILP are rigorous higher education programmes in technology areas, designed keeping the evolving needs of industry in view, and meant for working professionals in their respective domains. The very intent is to deliver the education at the workplace, in order that the greatest degree

of work integration of the education is achieved, and thus the WILP are very distinct in philosophy and pedagogy from open, distance learning programmes. Though it is incorrect and improper, at times the WILP are compared to ODL programmes. Accordingly, it has been our constant endeavor to engage with the regulator, and provide all necessary information about these programmes.

The WILP have been well received, and accepted by industry, because of the high quality of the programmes in terms of the curriculum and the instruction, and also because of the high degree of work integration, which results not only in up gradation of knowledge, but also in up skilling, and productivity increase.